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ABSTRACT

The implementation of a system of educational development in the College of Pharmacy at the Ohio State University in the form of an Office of Educational Development (OED) is described. A chronological history of OED is provided, and some of the more significant and interesting developmental events are highlighted, including curriculum development, instructional development, and support evaluation. An overview of OED activities and products is given including instructional support services, educational development projects, and student support services. The process of educational development is discussed in terms of the philosophy and techniques used by OED to help faculty modify their teaching styles, outcomes of educational development, faculty evaluation of OED, and future trends for OED. Resources required for establishing an educational development unit are suggested, and a variety of ideas for enhancing involvement in educational activities are presented. (SPG)

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ED157448

Final Report . . .

Health Professions Special Grant Program

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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THE IMPLEMENTATION OF A SYSTEM OF EDUCATIONAL DEVELOPMENT FOR UNDERGRADUATE PHARMACY EDUCATION

Under Grant From
The U.S. Department of Health, Education, & Welfare
National Institutes of Health
Bureau of Health Manpower Education

Dr. DeLayne Hudspeth, Director (July 1970-June 1975)

Dr. Daniel Krautheim, Director (June 1975-present, previously Associate Director)

Dr. Paul Carlson, Associate Director (previously Assistant Director)

Program Director

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HE 010 280

Final Report prepared by Kay Angona Adams

July, 1975

PREFACE

"A quiet change is taking place on College campuses: Faculty are being held accountable, as never before, in how well they serve students, and there is a marked shift in the way faculty are being evaluated.

What counts more and more is teaching, student advising, committee activities rather than publishing, researching, consulting, commuting to Washington. The familiar professional paradox is fading. Traditionally college professors were hired to do one job, teach, and were rewarded for doing another job, research. While this still is the case in most graduate schools, it is clearly not so in campuses stressing undergraduate education."*

The College of Pharmacy at the Ohio State University wishes to express its gratitude to the U.S. Department of Health, Education, and Welfare, Bureau of Health Manpower Education, Health Professions Special Project Grant Program for making this project report possible. A five-year grant from DHEW to the College of Pharmacy from 1970-75 has allowed the "Implementation of a System of Educational Development for Undergraduate Education" within the College to support and help improve the teaching-learning process. With the help of Dean Lloyd M. Parks, The Office of Educational Development (OED) was successfully implemented and continues to function within the College of Pharmacy. OED offers their sincere thanks to Dean Lloyd M. Parks for making this effort possible.

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* Seldin, Peter and Wakin, Edward. "Students Now Get to Help Decide the Worth of Their Professors"; The New York Times, June 8, 1975.

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PURPOSE OF REPORT

This report is based on a commitment to the National Institutes of Health (NIH) to disseminate information about the implementation of a system of educational development in the College of Pharmacy at The Ohio State University (OSU). This system, called The Office of Educational Development, has been in operation since 1970 under a grant from NIH.

A major purpose of this report is to share the experiences and insights gleaned from a five year effort to improve the quality of pharmacy education at OSU. A large amount of time, money, thought, and care have gone into building the Office of Educational Development (OED). The fruits of the labor cannot be fully shared in a document of this type and size, but a sample of the effort is provided. An honest portrayal will be attempted. The problems will be shared along with the successes. However, the report is not intended to be an objective evaluation. The bias of a "proud parent" will sneak through occasionally.

A second purpose of the report is to stimulate thinking and activities in improving the quality of pharmacy education at other colleges. A portion of the report is devoted to guidelines and options at various levels of sophistication for increasing educational development activities.

A third purpose of this report is to initiate interest in the development of a consortium of colleges of pharmacy who work together to improve pharmacy education. A consortium approach could increase the benefits from and reduce the cost of educational development.

In summary, the purpose of this document is:

to provide an honest but supportive portrayal of the OED experience

to stimulate thinking and activities in the area of educational development

to give compelling reasons for forming a consortium of colleges of pharmacy to improve pharmacy education.

DEFINITION OF TERMS

There are several key terms used in this report that need to be defined in an educational context. Precise meanings are important for clear communication. Definitions reflect usage of terms in this document. Please take a few moments to read over this list and use it as a reference for the document.

Educational Development A generic term encompassing the improvement of any or all areas of the educational process such as the curriculum or content, the teaching process or instructional methods, the professional development of faculty, the organization of instruction, and the recruitment and retention of students. Development refers to planning for, implementing, and evaluating changes in these areas.

Curriculum Development Activities related to improving the substance, scope, and/or sequence of what is taught.

Instructional Development Activities related to improving the delivery of content and the management of learning.

Faculty Development Activities related to the personal and professional growth of faculty at either the individual or the institutional level. It includes evaluating and improving teaching and instruction, facilitating service, research and publication in education, and personal development.

Evaluation Collection and use of information to judge decision alternatives. There are basically three times for evaluating an educational activity - before it begins, during implementation, and upon completion.

Measurement Measurement activities are sometimes confused with evaluation. Measurement refers to the design and use of devices to validly and reliably measure or assess individuals' knowledge, skills, or attitudes. Evaluation often uses measurement devices to help accomplish its goals.

Project An activity for improving or developing an educational method or product which has a clearly defined beginning and end, and undergoes a series of

developmental steps. A project involves collaborative activities between OED and teaching faculty.

Instructional Service The provision of materials and equipment to meet faculty needs for modern instruction, including production of audio-visual materials, provision of audio-visual equipment, computer services, test scoring and analysis, and procuring and evaluating commercially produced instructional materials.

Module A self-contained, independent unit of a planned series of learning activities designed to help the student accomplish certain well-defined objectives.

Individualized Instruction This is a generic term encompassing numerous approaches for tailoring instruction to the needs of individual students, allowing students to progress at their own rate, and requiring students to master a given unit of instruction before preceeding to the next.

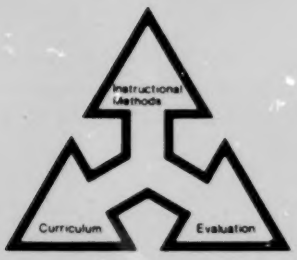
Programmed Instruction Instruction based on a carefully sequenced text which consists of a series of statements or "frames" designed to crystallize the facts or concepts to be learned. Test questions are embedded in the program, and immediate feedback as to the correctness of the students' response is provided. There are two main types of PI: "Linear programs", which require the student to follow all steps sequentially in the enitre unit; and "branching programs" where, depending on his responses, the learner is guided through one of several sub-units.

Computer Assisted Instruction Utilization of a computer terminal as a teaching machine. CAI most often uses a programmed instruction format.

Computer Managed Instruction Use of the computer to score tests, diagnose students' deficiencies, prescribe learning activities, and report learning outcomes. CMI is most often used to manage individualized instruction.

Personalized System of Instruction (or Keller Plan) The main feature of the

PSI format are: 1) each student proceeds through the course at a rate that he chooses, 2) each student must pass a test on a unit before working on the next unit, 3) a student who does not demonstrate mastery may take retests without penalty, 4) each test is graded immediately, 5) most of the formal instruction is given by means of texts and notes rather than lectures - occasional lectures are used for motivational purposes, and 6) proctors or student aids are employed extensively for test monitoring, scoring exams, and tutoring.



HISTORICAL PERSPECTIVE
OF
THE OFFICE OF EDUCATIONAL DEVELOPMENT

The Office of Educational Development (OED) had an auspicious beginning. The Dean and many of the pharmacy faculty members were interested in improving the quality of pharmacy education, and wanted OED to succeed. This section will re-trace the chronological history of OED, and highlight some of the more significant and interesting developmental events. The office has grown in staff, facilities, services provided, and content areas covered since the outset. Shifts in focus, expansion of productive areas, bolstering of sluggish areas, and, at times, curtailment of problem-ridden areas, have occurred.

Background

In the mid-60's Dean Lloyd M. Parks of the College of Pharmacy at The Ohio State University became actively interested in bringing in an educator to work with his faculty. Dean Parks sent a memorandum to the Vice President of the University, stating that he wanted to hire a full-time educator as part of his faculty. This request was subsequently approved, and Dr. Pat Schwirian, a Ph.D. science educator with a background in sociology was added to the faculty in September 1969.

In 1969, the College Faculty also received a request for proposals (RFP) from the National Institutes of Health, Bureau of Health Manpower Education. The RFP included two program topics - recruitment and instruction - which were of considerable interest to the College. The Faculty met regarding the RFP, and contacted Dr. Gregory Trzebiatowski, a faculty member of the College of Education, as a consultant.

Given the relatively short time for the development of the proposal, Dr. Trzebiatowski recommended that another educator, Dr. DeLayne Hudspeth, who was then directing Instructional Development at Syracuse University, be engaged to assist in preparing a proposal. Drs. Hudspeth and Trzebiatowski spent a few days interviewing the Faculty, and helping them to conceptualize an educational development system that would fit their needs. Dr. David Knapp, and other faculty in the College, then wrote the final proposal. The proposal was submitted, subsequently approved, and initially funded for a two-year period, with an option to renew the grant for an additional three years. Dr. Hudspeth was hired to direct the project in July, 1970.

The project called for developing a College-wide unit, which would "implement a system of instructional improvement for undergraduate education". As conceptualized, OED would focus on four major areas: curriculum and program development, educational research and evaluation, instructional development and support, and student recruitment. A full-time faculty member would head up each area.

The original objectives of OED were to:

1. Establish and operate an Office of Educational Development in the College for the purposes of planning, developing, implementing, and evaluating educational change.

2. Establish an instructional development and support service for the optimal use of instructional materials and techniques.
3. Systematically revise and update curriculum, and develop a significantly improved, multi-track professional curriculum.
4. Develop a research and analysis capability to permit proper evaluation of both present and proposed educational activities within the College.
5. Devise and implement recruitment activities with a goal of increasing enrollment.
6. Disseminate information related to the activities described above to other schools of pharmacy.

Organizational Role of OED

The faculty in OED have their academic appointments in the Division of Social and Administrative Science of the College of Pharmacy. The Director of OED reports directly to the College Dean. The organizational placement has allowed OED to exert considerable influence on the educational process within the College of Pharmacy. Initially, the project called for an advisory council, consisting of administrators, faculty, educators, and practicing pharmacists, who would meet twice annually. This group met officially once, and based on feedback from members of the advisory council and feelings of those in the College, it was decided not to use this mechanism.

The main OED personnel have faculty status, and went through the same rigorous hiring procedures as the other pharmacy faculty. The OED faculty have voting privileges, actively participate in College activities, and have built collegial relationships with other faculty members. The OED faculty also continue to build their professional reputations outside the College.

Two of the three Ph.D. educators hold joint appointments on a no-salary basis in the College of Education. The Director of OED maintains a national reputation in the field of educational development. All OED faculty make presentations to groups outside the College, provide consulting services, and publish occasional articles and papers.

The OED budget has come primarily from the NIH special project grant, although one OED faculty position was funded by the College. Since July 1975, OED has received most of its support from NIH capitation grant. Other special project monies will continue to be sought for specific projects.

The Effect of Staffing on OED's Development

Considerable attention was given to hiring a qualified and personable staff. Three Ph.D. faculty were hired to be full-time educators, and student recruitment was covered by a person who held a M.A. in history, but who had worked in the University Registrar's Office.

Dr. Hudspeth, the Director of OED and head of the curriculum component, was hired first. He had done considerable work in instructional development before coming to Ohio State.

Dr. Daniel Krautheim, who became Assistant Director and head of the instructional component, had been a Fellow in an instructional technology program at Indiana University. He had experience in medicine and dentistry, and came with a variety of health projects in his portfolio.

In 1973, a new staff member, Dr. Paul Carlson replaced Dr. Patricia Schwirian as Assistant Director, and head of the research and evaluation component. Dr. Carlson graduated from The Ohio State University, where he was trained in measurement and evaluation at the Ph.D. level, and communication at the Master's level. With this staff change, there was less emphasis on

research and more on the day-to-day evaluation and measurement needs in the instructional development process.

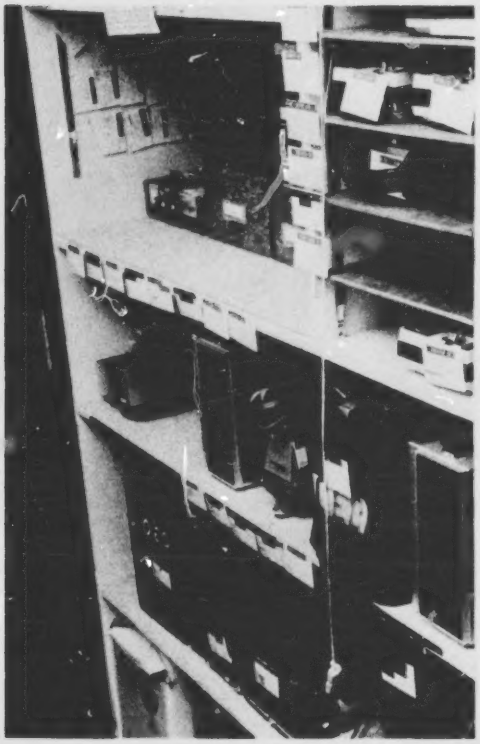
Student services and recruitment are an integral part of OED. Ms. Pat Brandt, the staff member in charge of recruitment from 1970-73, interacted frequently with the OED Staff to develop a dynamic recruiting program. Since 1973, when a new individual, John Kennedy, took over the role, the recruitment effort has shifted focus slightly (as in most colleges of pharmacy) to recruit and retain students of high academic standing. Partly funded with Special Project monies, a second staff member was also added in 1973 to handle the recruitment of minority students. Minority recruitment continues to receive emphasis.

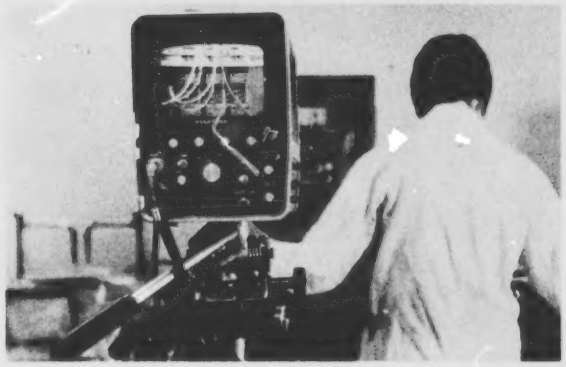
In addition to three Ph.D. level faculty, and those who work in student services, OED also has a support staff. OED operates on a premise that support for teaching and research should be equal. Therefore, graduate assistants, hourly personnel, and consultants are hired for a wide range of support activities, such as producing slides, transparencies, films, video tapes, quizzes and examinations, and graphics, reproducing and collating materials, developing instructional objectives, presenting faculty workshops, etc. These additional support staff range from 8 - 12 individuals, depending upon the nature and scope of current educational development activities.

The Effect of Technology on OED's Development

The range of services available from OED has expanded during its five years, because of investment in equipment used for teaching. Slide and overhead transparency projectors, audio and video tape recorders, TV sets, an offset press, and other communication tools are now commonly used in the College. The most expensive investment occurred in 1973 when the College

purchased a small in-house, time-share computer, and an improved test scoring machine that could input data directly to this computer. Having this range of equipment allows OED to employ the appropriate medium for different teaching situations. The situation may call for "complex" computer-assisted instruction programs, or simply helping a professor to improve his lecture with 35mm slides.





Levels of Educational Development

Educational development can occur at various levels, since improvement of education is a continuous process. Simple changes in improving the teaching-learning process can result in additional changes toward continued improvement. Continuous feedback on the educational process reveals additional possibilities for improvement.

The growth of OED over five years reflects an evaluation from lower to

higher level development activities. This development pattern reflects a general tendency, and not a rule. OED began some highly sophisticated development efforts, such as converting the pharmacy calculations course to computer-assisted instruction during its first year of operation.

At the outset, OED concentrated primarily on providing teaching support services to faculty. Support for teaching, such as developing audio-visual aids and student handouts to accompany lectures, reproducing materials, or scoring examinations received the most emphasis during the first year of the project. These activities allowed faculty to become familiar with educational development activities before engaging in larger change efforts. In subsequent years, the provision of support services began to be tied into development efforts of larger scope. Increased emphasis was put on improving teaching practices, increasing the variety of instructional methods used, improving examinations, and evaluating instruction during OED's second through fourth years. As faculty gained experience in, and some in-depth knowledge about, improving instruction, even more sophisticated development activities occurred. During the last two years, OED has increased emphasis on improving entire courses, re-shaping the objectives and content for a related sequence of courses, or an entire program, and analyzing the inter-relationships of the courses in the pharmacy curriculum. OED's focus on curriculum improvement has increased each year, and should continue to expand in the future.

OED attempts to increase awareness on the part of the Dean and the faculty concerning more effective and different educational development activities. Some natural evolution will occur as faculty become increasingly interested and experienced in improving instruction. Yet, it is necessary to continually upgrade faculty expectations through exposing them to new instructional options, methods for collecting better and more comprehensive evaluative

feedback on their instruction, techniques for re-shaping content, and a portrayal of the outcomes that can be expected from various development efforts.

Development of Systematic Techniques Through A Grass Roots Approach

OED has not concentrated on developing a generalizable and elaborate system of educational development. Rather, OED usually develops a unique approach to meet the needs of each situation. Learning theory, educational research, and prior development efforts serve as a basis for design. Instructional improvement occurs primarily through a series of small, short-term educational projects. Most projects are accomplished through collaboration with a faculty member, and are usually focused on improving one of the faculty member's courses. OED attempts to develop products and methods which are responsive to the needs and predilections of each individual faculty member. In a sense, OED has taken a grass roots approach to improving instruction.

During their five years of operation a wide assortment of general educational development processes and specific instructional methods and products have been developed and put into use. When a process or product works well in one course, another faculty member often wants to try it in his course. These processes and products are often then adapted to fit different situations. Systematic development techniques begin to evolve as a process which can be transferred to a different setting. OED has approached the development of a system for improving instruction by starting with specific needs and problems. When a unique process, method, or product is successful, it can be repeated or used in another setting with modifications. As the effort is repeated in several settings, generalizable processes and methods, or a "system" evolves.

Starting Up

To begin the process of educational development, OED personnel spent a great deal of their time meeting and interacting with faculty. Dr. Hudspeth recalls that he spent about 90% of his time interacting informally with faculty members. He used this process to develop a clear understanding of faculty members' needs and expectations, and to share his perceptions of educational development and the quality of education at the College of Pharmacy. Much time was also spent in College and University committees. Dr. Krautheim describes his office in the beginning as "...primarily the hallway. I wandered the hall and talked to faculty, introducing myself to those I hadn't met". From the outset, OED faculty were wary of insulating themselves from their clients, the Pharmacy Faculty. Top priority was put on building trusting relationships with the faculty and developing channels for honest communication, so that OED could address real needs. Two coffee pots (regular and decaffeinated) were installed in the OED Office to enhance informal communication.

With the phrase "give me your stickiest problem", OED embarked on its first instructional development project. The Pharmacy Calculations Course was currently taught via lectures and a programmed text. Data indicated that students were acquiring this information on a minimal level, and that retention levels over time were not satisfactory. Because some of the concepts taught in this course are essential for safe professional practice, and because they constitute essential learning for subsequent courses, it was decided to develop new instructional procedures. The programmed text currently used in the course was put on the computer. This option would provide individualized instruction for each student, and immediate feedback, using a learning format that was enjoyable. Considerable time and resources went into developing the PCALC Course without much improvement in student learning. OED soon discovered

that the programmed text that had been computerized was unsatisfactory for the students, and subsequently re-wrote much of the content. After five revisions, the PCALC Course is being offered regularly, with only minor modification.

In terms of development costs, PCALC was expensive. The project was a valuable learning experience in that it helped to orient OED toward two concerns that have affected all future projects. The first is a concern for practicality. OED encourages the development of products that are needed, and that can be easily used. Projects which have a quick return for the time and money expended are the most valued. Value is also placed on more costly projects which are worth the time and money invested. The second is a concern for the consequences of activities. Before OED begins a project, it begins to ask questions about what happens if they're successful. How much will this really improve student learning, and is the gain worth the investment? How will we know learning has improved? Are we sure this content should be taught in the first place? .... and so on. These and other questions help OED to focus on important concerns, and to maintain a responsible approach to solving instructional problems.

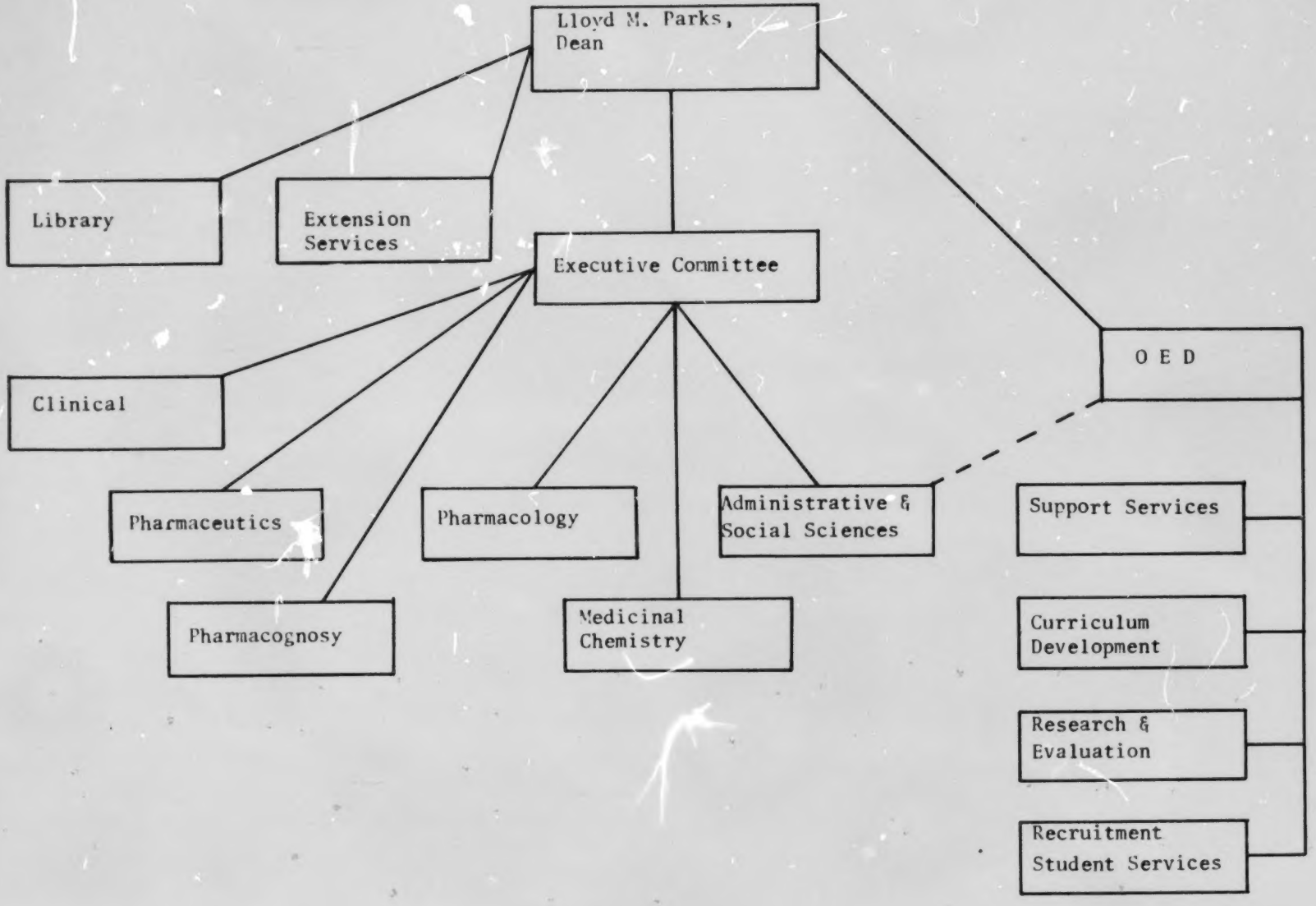
Summary

OED has developed as a responsive and responsible agency in the College of Pharmacy. Its organizational placement allows OED to take a high level of responsibility in educational concerns. A personable, highly-qualified staff, and varied technology, provide a competent and well-developed basis for improving instruction. Several changes in OED's focus have occurred with changes in personnel and the level of technology available.

OED has helped its faculty progress from simple to more sophisticated

levels of development during its five years. Systematic techniques for improving instruction have evolved from experience and underlying support from theoretical bases.

OED has now reached the end of five years of funds from NIH, but will continue to function as an active part of the College of Pharmacy.


Lloyd M. Parks, Dean
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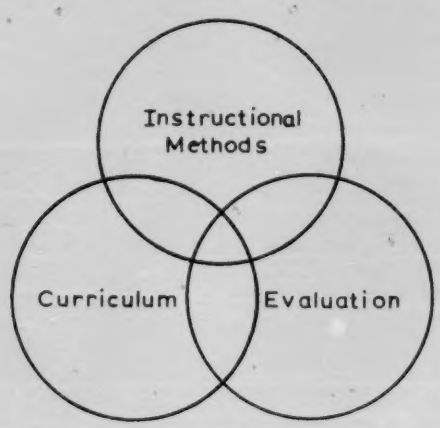
OED MODEL

The model utilized by OED emphasizes three major interrelated activities. These are curriculum development, instructional development, and support evaluation. Curriculum development focuses on the content and sequence of professional knowledge and skills. Instructional development focuses on the communication system used for teaching and learning; evaluation focuses on the collection and use of information to improve and measure the impact of instruction. Put in simpler words, the model focuses on what to teach, how to teach, and how to know if you taught successfully.



When asked about the utility of this model for other colleges of pharmacy, Dr. Hudspeth responded:

> "We are biased in thinking that this particular approach to educational development is exponentially more powerful than dealing with any of these factors exclusively. A potential danger exists though, in trying to describe what we've done and communicate the power of this model. Other colleges may feel that the approach is so complex and so rich, that is to say, takes so much energy and resources, that they may automatically decide against it. On the other hand, there is a danger in our simply describing the lower cost 'quick-and-dirty' approaches to one part of the model, since it's so easy for educational development to get out of kilter."

To lessen this dilemma, the following sections of the report will focus on how the components of the model work in concert and depend on one another, as well as on how the components work independently.

In practice, the model is well implemented. Each component is clearly defined and distinctive. Considerable development has occurred within each area.

Most OED activities occur in the area of instructional development. This component of OED receives the most use by faculty members. Dr. Krautheim feels that to demonstrate actual emphasis he would have to re-draw the model as three overlapping circles of descending size. Instructional development as the largest, evaluation as slightly smaller, and curriculum as about 1/3 its current size.

The faculty feels that the OED model is a good one. It forces the educational development function to focus on more than just instructional methods. It facilitates balance and follow-through of activities. The educator working in only one area of educational development may actually perform a disservice to a faculty. For instance, a faculty may spend a year writing objectives, then not be able to transform the objectives into instructional methods or assess the benefits from the improved instruction. In another situation,

sophisticated instructional methods may be used to teach weak content. It is easy to lose sight of the ultimate goal of educational development, to improve the teaching-learning process, if one area of development is over-emphasized. A three-component approach, emphasizing curriculum, instructional methods and evaluation helps insure responsible educational improvement.

Curriculum Component

Curriculum development is an integral part of OED, because the role of the pharmacist in health care is constantly changing. Pressures upon the College to constantly review and update the content of courses are evidenced by:

- the enormous increase in the amount of information in traditional subject matter areas and the increasing importance of new subject matter areas. These phenomena give special importance to resolving the perennial issue of what and how much to teach.
- the discussion of current students and recent graduates regarding the relationship of present curriculum requirements to different types of practice. Some educators have described this dilemma of the pharmacist in terms of being over-educated for traditional functions, and under-educated for an expanded role.
- new and diverse roles for the pharmacist are being delineated (e.g., therapeutic advisor to physicians, personal health consultant to patients, bulk compounder in hospitals, drug therapy monitor on the ward). Some means of specialized training for these roles is necessary without lengthening the professional program.
- the need for better integration of subject matter that is presently over-compartmentalized.

Because curriculum determination is rightly the province of faculty, the Office of Educational Development serves curricula improvement goals by:

- providing content analysis
- assisting in formulating course and program objectives
- developing communication between and within departments
- surveying new roles and trends in pharmacy
- developing and testing new curricula products

- developing new courses and programs

Content Analysis

Basically, content analysis is determining the scope and sequence of content. It includes delineating a course, program, or product into essential content areas, sequencing these areas, deciding the depth to which the areas should be treated, and determining the interrelationships between areas. This technique can be used as a systematic basis for developing new content or refining content which already exists.

Content analysis is sometimes used when developing new curriculum materials or upgrading courses. Supplemental materials have been designed for several courses on operation laboratory equipment. Content analysis is used to insure coverage of all important points in the material. Major revisions in two courses, Pharmacy Calculations and Introduction to Disease, used content analysis to refine and sequence the course content for maximum efficiency and student comprehension. Computer-assisted instruction in remedial organic chemistry used content analysis to develop an efficient instructional package.

For broader areas, such as analysis of a sequence of courses, content analysis has also proved useful. The Clinical Pharmacy Program is currently using content analysis to sequence courses, describe prerequisite courses from other divisions, and identify content gaps and redundancies in the pre-clinical pharmacy curriculum.

Content analysis is also a useful tool for developing objectives. Once content areas are identified, sequenced, assigned a degree of depth, and interrelated with other areas, they provide a framework for formulating prerequisite and instructional objectives. Content analysis has been used as a prior step to formulating objectives for the Clinical Pharmacy Program, and for several other courses.

Formulating Course and Program Objectives

The formulation of objectives is a companion step to content analysis. When content analysis is not used, several other options for development of objectives are available. Faculty often have existing instructional materials, which can be used to develop implicit objectives. Final examinations, quizzes, the instructor's slides, films or transparencies which illustrate the key points or key concepts in the course, lecture notes, and occasionally student notebooks are used to pinpoint objectives for existing courses. Once identified, the objectives can be modified and improved. The development of specific behavioral objectives has not been actively emphasized as independent activity. Objectives are usually developed because they are needed for another activity, such as improving exams, preparing item banks for exams, or as one step in improving a course.

The most energetic attempt in the area of program objectives has been the development of objectives for the Clinical Pharmacy program. Over a year has been spent in specifying prerequisite objectives or pre-clinical reuqirements, as well as objectives for a clinical program. The procedure for developing objectives is to develop a set of prototype objectives for one area of clinical pharmacy. The general strategy for developing these objectives is to write down what a student is able to do after instruction. These prototype objectives are then used by other faculty as a model for developing objectives. Objectives are sent to the curriculum committee for approval, and then to the faculty. Other steps in the process include 1) searching through the existing pharmacy curriculum to see if all the prerequisite objectives are taught through existing courses, 2) filling gaps by developing new pre-clinical courses, 3) designing a clinical program which implements objectives, and 4) developing a competency test to measure accomplishment of the clinical program objectives.

OED also assisted in developing the objectives for the Externship Program, a supervised training experience for pharmacy students.

Developing Communication Channels

Communication among the six divisions in the College of Pharmacy has been facilitated through OED. Since courses are interrelated across divisions, OED will sometimes invite a faculty member from one division to provide content input to a faculty member working on a project in another division. This occurs when: the content areas are related, one course is a prerequisite for the other, or one faculty member has used an instructional method or evaluation technique that the other wants to try. Meetings across divisions sometimes occur when a faculty member feels that another faculty member's project is encroaching on his content area. OED helps the faculty members get together to clarify their content domains so that their efforts can be made complementary rather than contradictory or redundant.

OED has also facilitated sharing between faculty members within divisions. In teaching situations where faculty give alternate lectures, team members often record lectures for review by other members of the team. Faculty members working in related content areas interested in trying out the same instructional strategy, are brought together to clarify and coordinate their courses.

OED also facilitates faculty communication through faculty meetings. Some faculty meetings, are used to provide information about the current educational projects of various faculty members. This often facilitates informal discussion among the faculty, as well as providing the faculty members involved in projects with recognition for their work.

Surveying New Roles and Trends

The emerging diversity of health care necessitates identification of new pharmacy roles and continual broadening of the pharmacy curriculum. Information is needed to update and expand the pharmacy curriculum in anticipation of these new roles. The task is enormous and requires research, planning and subsequent development.

OED has begun at the research stage to explore the future role of the pharmacist*. The Delphi Technique, a forecasting tool, was explored as a new approach to curriculum planning. The technique is designed to measure consensus with repsect to plausible events of the future. Significant statements about the "changing roles in the pharmacy profession" in the next 25 years were collected from deans, pharmacy students, practicing pharmacists, faculty and medical students. These statements were categorized, edited, reviewed by experts, and characterized by experts, and characterized by thirty-two events. Events were then rated by original respondents according to: 1) when the event would occur, 2) value to self, 3) value to profession, and 4) value to society. In each of three rounds, respondents are shown how their professional colleagues and students responded to each item. This process encourages consensus among the respondents which allows planning decisions to be made from a better information base.

The results of the study have been made available to the College Curriculum Committee as an aid to making future planning decisions.

A survey of all colleges of pharmacy, to determine new curricula and program thrusts, was conducted by OED in 1972 to collect information on the types of innovative content and programs used in pharmacy education across the country.

* Hudspeth, D.R. and Jennings, Linda, Changing Role of the Pharmacist: A Delphi Forecast. Columbus: OED, College of Pharmacy, The Ohio State University, July, 1974.

Developing New Curriculum Products

Several instructional development projects have required the development of new curriculum materials or a revision of existing materials. These projects draw heavily on curriculum development techniques, such as delineating objectives, analyzing content, surveying existing materials in the area, and developing content. New curriculum materials have been developed for the Pharmacy Calculation Course and a set of curriculum materials was purchased and revised for the Introduction to Disease course.

Additionally, new curriculum products have been developed for many projects of smaller scope. One particularly successful area is the development of materials to teach students how to operate complicated lab equipment. The materials save the instructor time and allow better transfer of information.* Other samples include computer-assisted instruction packages, transparency sets, and improved handout materials.

Almost all instructional development projects involve curriculum development to a greater or lesser degree.

Developing New Pharmacy Courses and Programs

Although OED has not been directly responsible for the development of new pharmacy courses and programs, input has been given at several levels. For example, when two faculty members decided to teach a new course on Individualization of Drug Dosage, OED provided input at the design level on instructional options. Two student-developed programs, A Drug Abuse Program and Hypertension Screening Clinic, received input from OED on communicating their message effectively. OED assisted in developing the objectives and assessment procedures for the Externship Program. Help has also been provided in developing new courses or the Clinical Pharmacy Program.

* Materials have been developed on operating a spectronic 20, liquid scintillation counter, and tortion arm balance.

A major thrust of the curriculum component at the outset was to develop a multi-track professional curriculum whereby pharmacy students would take a core of courses and then branch into a speciality area relating to their particular area of interest. An individual could then be trained specifically as a community pharmacist, therapeutic advisor to physicians, personal health consultant to patients, bulk compounder in hospitals, drug therapy monitor in hospital wards, industrial pharmacist, pharmacy educator, etc. Little progress has been made in implementing a multi-track curriculum. The amount of curriculum change necessary to implement a multi-track curriculum would require additional staff, and considerable energy from the faculty.

Problems in the Curriculum Component

Curriculum development is the least defined area of OED. It receives less time and is less successful than instructional development and evaluation.

Most of the curriculum development initiated by OED is tied to the personality of Dr. DeLayne Hudspeth who had the main responsibility in this area. Dr. Hudspeth is a highly skilled speaker and listener. This gives him the opportunity to serve as an instrument of change by emphasizing curriculum concerns and helping germinate ideas during faculty meetings, curriculum meetings and informal meetings. A significant portion of the curriculum development activities to date have occurred informally in this manner. Many of these changes are hard to measure.

The process of defining "what it is we want to teach" is extraordinarily difficult. This is true, in part, because the problem is not always rational. There are numerous reasons for selecting content to teach. Some faculty feel strongly that there are many aspects to an "educated person" not directly linked to professional activity so they want emphasis on liberal arts courses. Others are more inclined to emphasize skill training. Almost all faculty want to teach content that interests them and in which they have expertise.

As the content and roles for pharmacy expand and change, the process of changing content and courses in the curriculum requires considerable time from faculty. Content changes may be somewhat threatening if they affect teaching roles and responsibilities. There are numerous factors which influence the selection of content: particular research interests of a faculty member, personal biases toward appropriate roles for pharmacists, and other values and predilections of the faculty and the dean.

The knowledge base and tools to successfully perform curriculum development, such as models, philosophy, systems, and procedures are generally weak and underdeveloped. Although there is an academic discipline entitled curriculum development, the methodologies and functions performed by those in this discipline tend to overlap considerably with the related disciplines of instructional technology, educational psychology and educational development. These disciplines collectively provide the basis for sound curriculum development.

Summary of Curriculum Component

Although curriculum development remains somewhat difficult to define, it is nevertheless an important component of OED's activities. The emphasis on curriculum concerns is receiving major attention both locally and nationally. Curriculum development most often occurs as a companion activity to instructional development. These complimentary functions include content analysis, formulation of objectives, and development of new curricular products. Curriculum analysis is also used as a planning tool to support the expansion of traditional pharmacy curricula through surveying new roles and trends in pharmacy and through providing information for new courses and programs. A further benefit of curriculum development is the facilitation of communication within and between pharmacy divisions and with other university and community components. Curriculum development must occur if pharmacy education is to be relevant to changes in the

profession. The curriculum component provides balance and integrity to the total OED program.

Instructional Development Component

Newly conceptualized and ongoing programs must give attention to the specifics of instructional techniques and technology. The instructional development component addresses this need by providing the support system for planning, developing and testing appropriate instructional procedures. This includes activities such as:

- enhancing lecture practices
- designing and testing audio-visual teaching materials
- producing units of self-instruction
- developing alternate modes of instruction, such as computer-assisted instruction, simulation materials, closed circuit TV, etc.
- storing and retrieving instructional product information
- developing study aids and remedial materials for students

In order to accomplish these objectives, the Office of Educational Development has a variety of instructional support capabilities (such as photographic production, graphics, etc.) which are described in some detail in the section on support services.

Enhancing Lecture Practices

Several years ago a conversation took place between Dr. Lester A. Mitscher, then an O.S.U. Pharmacy professor, and Dr. Krautheim. This conversation led to

the development of an instructional approach for supporting lectures that has had wide popularity with the faculty. The conversation was captured on videotape, and is reproduced below.

Dr. Krautheim: What do you feel are the main problems in your course in Natural Products Chemistry?

Dr. Mitscher: The subject matter for this course involves fairly complicated chemical structures of antibiotic families, alkaloids and glycosides. In my experience, students have difficulty transcribing these accurately. They sometimes complain after exams that I've marked a correct answer wrong. It turns out that when I look at their notebook they have faithfully learned what they wrote down, but it isn't at all what I put on the blackboard. There is not a satisfactory reference book that they can fall back on for much of this material.

Another problem is that students have difficulty listening to my explanations at the same time they are trying to get my material off the blackboard, and it takes quite a bit of time for me to draw the structures on the board. There's got to be a better way.

Dr. Krautheim: Have you looked at student notebooks in detail?

Dr. Mitscher: Well, from time to time when a student has complained, I've looked at a page that related to a particular exam item -- but not in detail.

Dr. Krautheim: Why don't we get a couple of students, and look through their notebooks to see what they have down. From that we can generate the points where they're having particular difficulty, and start with those first.

Dr. Mitscher: All right. It might be useful to get hold of notebooks from students who've done rather well in the course. You'd presume that their notebooks would be accurate.

Dr. Krautheim: Right. Of course, we might also find interesting information from the students who've done poorly. We can check both. Have you ever used slides to illustrate structures and key concepts?

Dr. Mitscher: No, not really.

Dr. Krautheim: You might also consider slides or transparencies, so that you don't have to draw all the material on the board.

This conversation resulted in several meetings. OED began to help Dr. Mitscher develop a new instructional approach. A graphic artist was used to

draw the chemical structures accurately. The chemical structure, structure proof, and other information were put on the left-hand side of the page. The right-hand side of the page was left blank for students to take related notes. The material also includes collateral references which can be found in journal articles and reviews in the library. The final format was a booklet of handouts for students' use in class. OED also helped Dr. Mitscher develop a series of transparencies, which were later converted to 35mm slides depicting identical structures to those found in the student notebook. These can be displayed while the instructor is lecturing, and help him pace, sequence and clarify his lecture material.

Several other professors are currently developing this type of lecture support material for their classes. On a recent questionnaire to the pharmacy faculty, the faculty rated design and use of course handouts as the topic that they would be most interested in exploring further.

Several other techniques for enhancing lecture practices have been developed and used.

Overhead transparencies that can be revealed sequentially allow the instructor to pace his lecture so that students aren't copying down one thing while the instructor is discussing something else. Professors can also write on a blank transparency rather than the blackboard, so they can face the class while writing.

OED helps the faculty comfortably and conveniently use overhead projectors, slide projectors and pointers to point out important concepts on slides and transparencies while lecturing, cassette recorders, film projectors, and professionally-drawn handouts. Legibility and quality standard are applied to visuals, and many slides and transparencies, and handouts were re-done

to accommodate larger audiences, or present information more clearly.

For one large service course offered to non-pharmacy majors, "Rational and Irrational Use of Drugs", the audit procedure was used to assess existing lecture strategies and supplementary materials. This procedure requires that an OED faculty member attend all lectures of the course and take notes concerning perceived objectives and methods of communication. Based on these reports, instructional method options were presented to the lecturer and several teaching improvements were made.

Designing and Testing Audio Visual Teaching Materials

As discussed above, audio-visual materials are frequently used for lecture support. They have many other uses.

Slide tapes have been developed for several courses to describe laboratory

equipment operations. Students can review the slide tapes on their own relieving the instructor of repeating the same instructions eight to ten times for small numbers of students in lab sections. This self-instructional format has been used to describe the process of operating a visible light spectrometer, a liquid scintillation counter, and a tortion arm balance. OED has also purchased several commercially-made slide-tapes on equipment operations.

Slides-tapes have also been developed to disseminate information on various topics. A slide-tape on the operation and use of the Drug Information Center at The Ohio State University was used both within the College and at other institutions. A slide-tape on poisonous plants is used by students to supplement curriculum and by alumni with community groups. A series of library training modules, using slide-tapes were developed to train students to make better use of the library and reduce library staff time in assisting students. Modules were produced on the card catalog, reference books, current periodicals, use of major indexes in pharmacy, and a simulated search for drug information. Slide-tapes on OED's photographic services, test scoring and analysis procedures, and a description of the activities in a Professional Practice Course have been developed for use in explaining OED activities to groups outside the College. A slide-tape on how to make slides is currently being developed for pharmacy graduate students who use OED facilities to develop seminar materials. Slides portraying various aspects of OED activities are frequently used to support talks given by the OED faculty to outside groups. One 8mm film on Drug Abuse Information was produced by a group of pharmacy students to accompany talks to public school children.

Video tape, although used less frequently, is a desirable medium,

because of its ease of production, display, immediate replay capability, and availability.

For a Professional Practice Course video tapes were made of practicing professionals presenting information on prescription accessory topics, such as invalid aids, hyperalimentation, ostomy accessories, thermal therapy materials, I.V. admixtures, surgical accessories, and others. After viewing the video tapes, a series of audio taped problem situations are presented for students to resolve. (See the following section for a further discussion of the simulation techniques utilized for professional practice).

Video tape has been used to record laboratory experiments. One tape illustrates drug absorption rates utilizing goldfish. Another tapes demonstrates a variety of drug effects on the right atrium of a guinea pig heart. A video tape on the educational applications of television was also produced.

Video tape is also used as a beginning phase for the development of a slide-tape or film, by making a tape of current laboratory demonstration procedures.

A package of 130 audio tapes was purchased several years ago from the University of Iowa to use in the Introduction to Disease Course. This procedure has recently been supplemented with additional materials and computer management. New adaptions of this course are discussed in the following section.

Developing Alternate Modes of Instruction

Several applications of the computer as an instructional tool have been developed.

One instructional option is computer-managed instruction. The self-instructional Introduction to Disease materials, modeled after the Keller

Plan, allows students to progress at their own rate, and uses the computer for total management of student data. The course is divided into 14 modules. The computer assigns students one of three criterion-referenced tests, and keeps track of their grades. A computer-interfaced test-scoring device scores the tests, and provides immediate feedback to the students. Students not achieving a predetermined criterion level are required to take another form of the test. The computerized system for this course assigns the appropriate test to each student, scores tests immediately, maintains a cumulative grade record for each student, and retains summary data on all tests so that the instructor can monitor student progress and examine the course for weaknesses.

The computer is also used to provide skill practice for students. The Pharmacy Calculations Course uses a series of computer-based problem-solving exercises. This traditional lecture course was divided into eight learning

units. The student folder for each unit has a clearly stated set of objectives, assignments and materials to study, and the steps for learning are carefully described. When students have completed the study material they proceed to the computer for a series of practice problems. Each series of practice problems begins with a pre-test and ends with a post-test, which the student can use to judge whether they are ready for an examination. The computer was used for its problem-solving and data collection capability and to provide information for further development.

Another instructional option, simulation, uses the computer or other media. The Professional Practice Program utilizes various simulation activities to help students obtain practical experiences. One computer program simulates a drug inventory system, and helps students learn to routinely monitor and order pharmacy supplies. A second computer program simulates a patient record-keeping system under conditions which allow the student to solve problems which may be encountered in professional practice. The problems include identifying potential drug/drug interactions, responding to physician and patient requests for drug histories, and providing information for law enforcement and drug control purposes. Students can input and query the system with procedures similar to those found in modern pharmacy practice.

A third simulation technique using audio tapes allows students to project themselves into current professional practices and develop skills for interacting with clients. Selected community pharmacists were asked to keep diaries of problem situations. Based on these situations, audio tapes were produced, edited, and later transferred to cassette form. The students listen to each situation in class, and react verbally. A community or hospital

pharmacist is present for each class session to interact with students concerning their reactions to the situations. The audio tapes also include possible solutions to the problem situations. After listening to a solution, students make critical comments and discuss the consequences of various solutions.

Developing Better Study Materials for Students

Several types of instructional materials were developed to assist student learning and retention.

Study guides containing bibliographic information, questions on important points in readings, graphs and other materials, were developed to help students learn to perform product evaluations for a pharmaceutics course.

Computerized preview quizzes were prepared for a pharmaceutical marketing course, to help students study for regular exams. The quizzes help the student prepare for the content of an exam, as well as the instructor's exam style and format. Students can test themselves at a computer terminal and obtain immediate feedback. If a student's response is wrong, there is an explanation of why the response was wrong, and an invitation to choose another answer. Since this is a learning experience -- not a testing activity -- each student is permitted up to five choices on each question. Data from the students' performance on computerized quizzes can indicate to the instructor possible curriculum or teaching method deficiencies.

Remedial materials covering mathematics and general chemistry were purchased and revised for the pharmaceutical analysis course to assist students in the recall of previously-learned material. A slide-tape mathematics series was purchased from the Communication Skills Corporation. General

chemistry modules available from The Ohio State University Computer-Assisted Instructional Division, were adapted to the College of Pharmacy's time-share mini computer system.

Computer programs were written to help students perform the necessary data analysis for some laboratory experiments. The algebraic manipulations for radio immuno assays research and regression analysis for the Hansch equation are now accomplished via computer programs. A computer program was also designed to allow students to store and retrieve their experimental data, determine means and standard deviations, and run t-tests for drug absorption experiments.

The slide-tape presentations on using the library efficiently, which were described in the section on audio-visual teaching materials, also help students make better use of their study time.

Information Storage and Retrieval

Several professors use a grade file management system allowing instructors to store and retrieve students' examination grades and the criteria on which the grades are based. A report of student progress within the laboratory can also be obtained from the computer. In large classes, the instructor can use this information to easily assign grades at the end of the quarter. Students can also retrieve his/her own record of grades by a simple query on terminals throughout the building.

An administrative record-keeping system is used by OED to inventory equipment and catalog faculty evaluated materials. Pharmacy student demographic and scholastic data are stored in a master file. This information is used to generate information for reports and questionnaires, determining student recruitment activities, and generating class lists based on machine-scored exams.

Evaluation Component

Evaluation and measurement can serve as both an impetus and a measuring device for change. Analysis of the items used in examinations can give a professor insights into problem areas in his course. Improvement of examinations may help the professor clarify his teaching objectives and strengthen his course. These activities can serve as an impetus for change. In another role, evaluation can be used to measure the quality and impact of instruction and to collect information for improving instruction.

Current evaluation activities include:

1. Test construction, scoring, and analysis
2. Evaluation of instruction
3. Evaluation of projects
4. Evaluation of college-wide programs
5. Evaluation of current problems
6. Research projects

Test Construction, Scoring, and Analysis

When a professor asks for help in constructing or improving tests, a simple step-by-step system is used. The instructor is given four development aids and several short articles on constructing good tests. The first is a matrix with Bloom's cognitive taxonomy* across the top and space to fill in the major course content areas and percentage of time spent in each area down the side. An appropriate number of items can then be written for each cell which helps insure fair sampling of course material. A second aid is a listing of different types of multiple-choice questions. This provides the instructor

*Bloom, Benjamin. Taxonomy of Educational Objectives: Cognitive Domain, _____

with the various ways he can use multiple-choice methodology for measuring each level of Bloom's cognitive taxonomy. The third aid is a precise set of guidelines (Do's and Don'ts) for writing quality test items. The fourth is a set of criteria for judging the difficulty discrimination, and validity of items for use in interpreting item analysis.

The faculty member writes initial test items using these aids then goes through a process of review, discussion, and refinement with OED to finalize the test items.

The test is then administered to students and OED provides assistance with scoring. To assist with the scoring of classroom tests and analyzing evaluation data, OED has purchased two test scoring machines. These devices are portable so examinations can be scored right in the classroom if desired. A student's mark-sensitive answer sheet can be scored, the errors marked, and the results returned to the student immediately.

When this test scoring machine is coupled with a computer using a program to accept the incoming data, the test scores can function as a data input device to the computer. This means that the machine has the capacity to transfer test data from the mark sensitive answer sheets directly to the computer without the usual data transfer to computer cards. If errors are found in the answer key or the exam is modified, changes can be made directly on line with the computer. The hardware for the system, a Datronic RST-5500, was developed by 3M Corporation. OED has significantly broadened the scope of what the 3M test scorer can accomplish by writing comprehensive data analysis programs to go with the hardware.

The program developed by OED entitled "A Modularized Statistical Evaluation Package (MSEP)" is used to perform item analysis and other statistical routines for examinations. This information can be used by the instructor to modify the exam both before grades are assigned and for future use. The MSEP program is also used to input attitudinal, demographic, and types of data to the computer for later analysis.

Several factors resulted in the decision to develop MSEP:

1. The availability of an in-house computer system.
2. The availability of in-house programming personnel.
3. The lack of file management and statistical software to analyze the RST-5500 data on the Hewlett-Packard 2000F computer.
4. The need to provide a printout with greater utility to faculty members.
5. The need to provide a flexible system with a variety of data analysis options.
6. The need to provide rapid turn-around of statistical analysis of

examinations and evaluations.

7. Problems experienced with a previous test-scoring-machine and the associated statistical software.
8. Inconvenience and poor turn-around encountered with the campus test-scoring service.

The MSEP Program is one of the most successful and useful developments emerging from OED. The program has received acclaim from both inside and outside the college. The title, "MSEP", is somewhat misleading since it is more than just a package of statistical routines for analyzing test data.

The first part of MSEP, referred to as MSEP Executive, has several salient features which make it unique in the country. MSEP Executive is that part of the program which interacts with the user sitting at the computer terminal. MSEP Executive accepts data from the test scoring machine and puts the data into a computer file. Once the data is in the file it can be used in a variety of ways. Programs which are compatible with MSEP can be called up to analyze the data as test, demographic, attitudinal or evaluation of instruction. The ability to take information, read it, put it into a computer file for analysis is the major strength of MSEP Executive. Another strength is that new MSEP file compatible programs can be written and subsequently executed through MSEP Executive.

MSEP is divided into a series of modules, because the entire program is larger than the core memory of the computer. MSEP Executive directs the selection of modules by getting information from the user. It brings the modules, which are small enough for core to handle, into action one by one. The MSEP Executive allows the user to select any individual module or sequence several or all modules together for a series of analyses. The MSEP Executive

program also controls analysis options so that any sub-group of items can be analyzed separately and selected items can be weighed. MSEP Executive permits the accumulation of data in the file over time for later analysis or transfers data to magnetic tape if long-term storage is desirable. Since MSEP is modular, new modules can be added easily without rewriting the entire program.

The second major part of MSEP, the MSEP statistical modules, is designed to give instructors an extensive statistical analysis of examinations. Each statistical module is self-contained and independent of other modules. The execution of the statistical modules is controlled by MSEP Executive. Currently, the user can select any combination of eight statistical modules.

The functions of the eight statistical modules are outlined below:

MOD1 - prints student's name, ID, score percent and standard score.

MOD2 - prints distribution statistics.

MOD3 - prints a test item summary (item frequency distribution, discrimination index, item difficulty).

MOD4 - prints summary statistics (mean, median, reliability estimates, etc.)

MOD5 - prints a detailed item analysis.

MOD6 - prints a histogram of scores.

MOD7 - prints student data listed by ID code for grade posting.

MOD8 - prints subgroup scores and totals for each student.

MSEP provides a printout of the selected statistical analyses performed on classroom tests which is easy for faculty members to read, interpret, and use. A printout of student's grades for posting is also provided.

Test measurement criteria are applied to each item to identify items which perform poorly. These items are then improved before being used again.

Course content relating to frequently missed items is often explored and subsequently revised. Multiple-choice items that are missed by a large portion of the class are sometimes used as a learning tool in the classroom. Items can be either photographed for a slide or placed on an overhead transparency along with the class distribution for each item. By going over the items, in class, the instructor can interact with the class concerning their choices.

Evaluation of Instruction

Evaluation of instruction is done at both the course and program level. The primary tool for course evaluation is Student Evaluation of Teaching. Evaluation instruments can be developed by the instructor using a computerized program or can be constructed with assistance from OED if needed. A computer program developed by OED is used by faculty members to create student evaluation of teaching instruments which are tailored to their course. This program titled: "Individualized Student Evaluation of Teaching (ISET)" answers a strongly felt need in the College of Pharmacy. Most professors were interested in obtaining student feedback to their course, but were dissatisfied with the University evaluation form. It was time-consuming for the evaluator to work with each faculty member to create specialty instruments. ISET allows instructors to construct their own instrument by selecting from an item bank in eleven different areas. Additional features include instructor generated items, rating scale selection, an edit capability, and a printout of the final instrument for duplication. A faculty member can sit down at the terminal and develop the instrument in 10 to 15 minutes.

After the students fill out the instrument, results can be analyzed using a computer program developed by OED, "Item Statistics (ISTATS)", which provides the item distribution, the percentage distribution, the mean, and the standard

deviation for each item. The results are discussed with each faculty member and a criterion level for acceptability is determined. Items not meeting this criterion, items with large standard deviations (which indicates lack of student agreement on the question) and student comments are examined. In this way the professor can gain feedback about his course content and teaching style.

A special filing system has been developed to insure security of set results. If there are several instructors for one course, each professor receives only the feedback that relates to his performance as a teacher, unless all the instructors agree to share their evaluation data.

Professors can also use results from SET instruments to compare student response to their course over several quarters. SET data from sequence of courses can be analyzed so that groups of courses or entire programs can be evaluated.

Evaluation of instruction data is also collected from students involved in field experiences and from alumni under the auspices of the Undergraduate Student Pharmacy Council. Students provide feedback directly to the faculty concerning their field and clinical experiences. The procedure allows small groups of students to respond to in-depth questions concerning their experiences. Follow-up evaluations are periodically sent to pharmacy graduates to obtain specific feedback about the relevance of courses to their professional practice. Results from these evaluations are subsequently used to help modify curriculum and teaching strategies.

Evaluation of Projects

Instructional development projects require two types of evaluation. The first formative evaluation involves the collection of information to assist in the developmental process. The second summative evaluation determines the value of a product in relationship to its objectives. Information on success of projects can be used by the sponsoring faculty member as documentation for promotion and tenure, by other faculty members who want to try the method, and for obtaining additional funding through grants and other sources.

Since each project is unique, a variety of formative evaluation formats are used for evaluation. In the development of curriculum materials a detailed methodology has been developed for the evaluation of instructional materials and class handouts. First, students are asked to list the pages of the material that were the most confusing to them and the pages that were the most helpful and to explain why. Student comments are put on the back of the appropriate pages in the instructor's copy so that the information is readily available for revising the materials. The most helpful pages are used as models for refining the material and the most confusing pages are revised. Secondly, information is obtained on the usefulness and appropriate level of depth for each course topic. Finally, specific questions concerning various aspects of the materials are included. In larger classes the instructional materials are divided into 3 or 4 sections and students are randomly assigned to evaluate one section of the material.

In the Computer Assisted Instruction course, in Pharmacy Calculations, students complete a computerized evaluation after each lesson. If they are having difficulty with a particular section, the computer automatically

branches them to the appropriate remedial information. At the same time information of the effectiveness of instruction is collected and stored for later analysis by the instructor.

Questionnaires or interviews are also used to collect information for improving an aspect of his course. When evaluating instruction, other factors in addition to student evaluation of teaching are considered. These factors include: student performance on final course exams, results of state board exams, alumni ratings of course relevance, and peer evaluation.

Evaluation of College-Wide Programs

Evaluation is tied to several college-wide programs. One such program, the controlled externship experience, involves students working as apprentices to pharmacists for academic credit. Two levels of evaluation are done: 1) evaluation of students within the program, and 2) evaluation of the quality of the program.

For evaluating students, the Preceptor's Observation Index (POI) was developed for use by sponsoring pharmacists in rating students. The POI consists of statements about essential knowledge and application of principles, processes, and techniques necessary to the practice of pharmacy. The pharmacist rates the quality of the extern's knowledge base and performance. This rating is used both to guide the preceptor in determining student weaknesses and to assist in assigning final grades. To help standardize the preceptor's rating of students, a series of video tapes were developed with students performing tasks at various levels of proficiency. Through a series of successive ratings and discussions, a fairly high level of interrater agreement is obtained.

Externship has been evaluated during the 1973-74 and 1974-75 academic

years. The evaluation focused on several dimensions including: a) comparisons between externs and interns on state board exams and other objective tests, b) attitudes, c) tasks performed, d) oral responses to simulated patient requests, e) preceptor ratings, and f) achievement of externship objectives.

Ad Hoc Evaluations

Occasionally a critical situation arises within the College which requires quick access to information. An evaluation is developed which will provide information to aid decision making on the part of the Dean, faculty or students. Since these evaluations may be sensitive, the information is provided only to the client that requested the service and OED's involvement is limited to the development of the instrument and the analysis of the data.

Research Projects

Considerable emphasis has been placed on the systematic collection of research data. The development of instructional strategies provides fertile ground for action-oriented educational research.

A diagnostic testing program developed to test entering students' competency level in Reading Speed and Comprehension, Memory, Problem-Solving Ability, Spacial Relationships ability, Mathematics, as it applies to Pharmacy and Chemistry is currently being validated. When completed, remedial materials and programs will be identified or developed to remedy student deficiencies. Several small research projects have been conducted to compare various instructional methods. For example, a comparison of study methods is being done in conjunction with the Introduction to Disease course. A continuation of some longitudinal studies of students started by the St. Louis College of Pharmacy two years ago were recently completed by OED.

Several research projects are also discussed in the curriculum section.

Prior to 1973, several major research efforts were conducted by Dr. Schwirian.* A five year study of the personal, demographic, and attitudinal characteristics of pharmacy students in Ohio was conducted for the purpose of predicting success and failure among perspective pharmacists. Also, a five year study to develop a national "profile" of beginning pharmacy students in terms of selected academic, demographic, personal, and attitudinal characteristics was conducted in conjunction with the American Association of Colleges of Pharmacy. The purpose of the study was to determine who chooses pharmacy as a potential career, why they choose it, and what they plan to do in the profession. A diagnostic examination in organic chemistry was developed and validated. Questions were constructed in the areas of Nomenclature, Structural/Functional Groups, Physical/Chemical/Mechanical, Isomers/Conformers, Reactions/Synthesis, and Test Reaction. A Q-sort methodology was used to determine levels of difficulty.

Evaluation Concerns

A major problem is lack of understanding by the faculty concerning educational evaluation, the difference between measurement and evaluation and the use of evaluation to improve educational efforts. Although evaluation can be useful in a variety of situations, most OLD evaluation activities concentrate in two areas, test construction and evaluation of instruction. Education of the faculty on the multi-uses of evaluation is needed to increase the variety of uses.

*For further information on these research efforts, contact Dr. Patricia Schwirian, Assistant Professor, College of Nursing, The Ohio State University.

Summary

About 50% of the evaluator's time is involved with measurement: constructing, analyzing, and improving classroom tests. A wide variety of evaluation activities occur. The computer is used fairly extensively as an evaluation tool. Evaluation of instruction is accomplished primarily through students' evaluation of teaching. Two types of project evaluation are used - formative evaluation for improving projects and summative evaluation to assess their effectiveness. Evaluation of several college-wide programs is accomplished by OED. Evaluative information for use in making critical decisions is collected on request.

These evaluation activities facilitate and improve OED's other major functions, curriculum and instructional development.

Ancillary OED Functions

In addition to the functions regularly performed by OED through its projects and support services, a variety of activities is sponsored both inside and outside the College.

A Teaching Skills Institute was offered by OED during the summers of 1973 and 1974. This seven-week seminar, held at The Ohio State University, was offered to interested pharmacy faculty members across the nation. Twenty-two professors were paid a stipend to attend the Institutes. The Institute covered a variety of topics related to the teaching/learning process, such as developing instructional modules, individualizing instruction, developing objectives, managing self-instructional systems, using media effectively, improving teaching strategies, preparing examinations, evaluating teaching, evaluating instruction, developing diagnostic tests, analyzing curriculum, and facilitating planned change. Twelve educators with expertise in various aspects of the educational process and health sciences presented different parts of the Institute. The Institute used a variety of instructional formats, including lecture, small group work, individual study, demonstration, and field trips. Faculty members worked on a project in their area of expertise. This allowed participants to apply the new knowledge and use feedback from educators and their peers, to further improve their courses. Both Institutes were rated by participants as very successful. Follow-up evaluations of the professors involved show that most are using the techniques and knowledge learned, and feel that their instruction has significantly improved.

OED has developed several university-wide seminars for graduate students and faculty related to educational development. In-service seminars are also offered in Educational Computer Applications, Graphics, Evaluation, and Instructional Strategies. A graduate course in College Teaching is also team-taught

by two OED faculty. The OED Faculty occasionally participate in regularly scheduled graduate seminars to discuss pharmacy education topics.

The OED faculty provides consulting services to a variety of groups interested in improving instruction. In addition, OED Faculty attend and give presentations at various professional meetings.

OED also provides assistance to the Office of Public Relations for the College of Pharmacy, by helping faculty members prepare final manuscripts for publication, and assisting in generating news releases for the University and local press. OED has also developed slide tape programs for the community concerning drug abuse, poisonous plants, and The OSU University Hospital Drug Information Center.

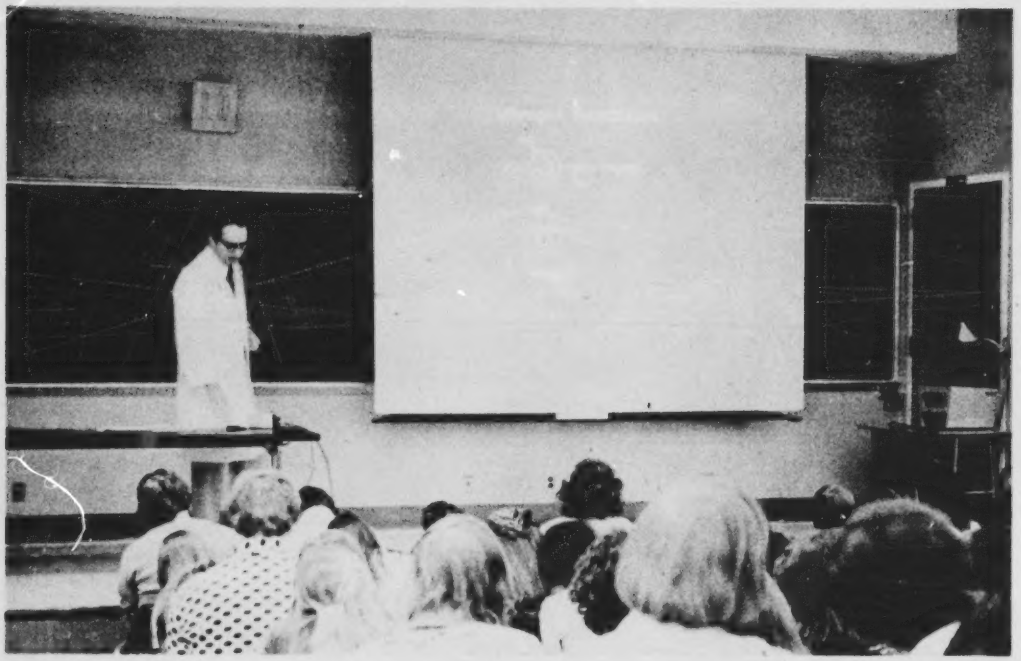
In 1973 OED distributed to other Colleges of Pharmacy a dissemination brochure describing current projects. This brochure generates requests from other colleges for more information from faculty concerning their projects. These requests are typically channeled by the faculty member through OED for a response. In addition, there are frequent visitors to OED from other colleges in the health sciences who are interested in seeing the facilities and gaining some in-depth knowledge about the operation.

OED involvement outside the College of Pharmacy helps maintain current information about educational development. It provides a vehicle for the sharing of successful instructional techniques and information and allows OED to obtain feedback for improving and expanding techniques from other sources.

OVERVIEW OF ACTIVITIES AND PRODUCTS

Although there is some overlap, OED works with the pharmacy faculty at two levels of activity, the project level and the teaching support service level. A project is a clearly defined activity for improving or developing an educational method or product. The project level involves analysis of objectives, alternate teaching strategies and typically includes evaluation procedures. Examples of projects include: the development of a coordinated set of slides and student handouts as lecture support material for a course; the development of objectives for an area of the curriculum; or the evaluation of an instructional procedure. Projects sometimes involve only a curriculum, instructional, or evaluation concern but more often involve all three components. The service level consists of providing materials and equipment to meet faculty needs for modern instruction. When satisfying service requests, it is frequently possible to suggest ways of improving the quality of materials, or the teaching method. Teaching support services are offered primarily by the instruction component, however, support services are also included in curriculum development and evaluation. Curriculum services include activities, such as helping faculty assess commercial instructional materials and media packages and collecting information on future trends for pharmacy education. Instructional services include the production of audio-visual materials, duplicating services and computer support. Evaluation services include activities such as scoring and analyzing examinations and providing other data analysis services.

Instructional Support Services



Instructional support services was the first component of OED to be developed. The majority of these services relates to improving instructional methods and a wide variety of simple to sophisticated services is provided. Most faculty members use the support services occasionally; many use them extensively. A handbook has been prepared to explain available resources and response times for the various services.

OED provides support services for faculty involved in projects, as well as for general College use. Faculty and graduate students may use the facilities for their own publications, professional meetings, and non-project materials, although instructional applications receive highest priority.

The provision of faculty support services is the objective of OED. Faculty members need to have the same level of support for teaching as is needed for research. The support service function brings faculty into close

contact with OED personnel. A faculty member may come in to have a few class handouts duplicated, and find that questions may be asked about how the handout is used and how it fits into the total course. Many larger change efforts have grown out of extended service functions.

The Office of Educational Development offers the following instructional support services:

Audio Tape (reel-to-reel and cassette)

Commercial Materials Selection

Computer Services (instructional dialogue and data processing)

Dry Mounting and Laminating

Graphics

Overhead Transparencies

Duplication

Photographic Services

Test Scoring and Analysis

Video-Tape and Closed Circuit Television

OED also sponsors the following student support services:

Recruitment

Tutoring

Study Skills Referral

Orientation

Personal and Financial Aids Counseling for Minority Students

Audio Tape

OED will check out audio equipment, such as cassette players, reel-to-reel tape recorders, and tapes to faculty and graduate students. Special arrangements can be made for the services of an operator, if necessary.

Arrangements can also be made for OED staff to set up equipment in classrooms or labs immediately prior to instructional use. Audio tape can be used to:

1. Record lectures or explanations for student review. Students can check out cassette tapes for use at home or in the library carrels. They can review lectures not easily understood, correct or complete their notes, or make up lectures they had missed.
2. Replace some lectures entirely. Audio tapes, plus related graphics, can often replace lectures without a decrease in student learning.
3. Supplement lecture material. Short reviews of prerequisite materials, and challenging ideas for the advanced student, can be made available on an independent study basis.
4. Evaluate and revise lectures. An audio tape can be made for the private self-evaluation of an instructor's presentation.
5. Record demonstrations or instruction. Tape recordings of the instructions for operation of a laboratory instrument, for instance, can guide a student through the correct operation the first time. Slides can be linked with the tape, if necessary. Students may repeat and practice the procedure as often as they need without requiring instructor time.
6. Record guest lectures for student review, or for use by future classes.
7. Record lectures or conversations of persons who cannot appear before the class in person. Portable tape recorders make it easy to interview persons outside the College. The tapes (with related graphic materials) can be used by individual students for independent study, or by the class as a group.
8. Present simulated professional situations and problems.

Commercial Material Selection

There are an increasing number of commercially produced teaching materials which can be used in the pharmacy curriculum. Some are directly applicable and well produced, while other materials are partly relevant or poorly prepared. Very few commercial packages come with evaluation instruments or data concerning their effectiveness.

OED helps faculty gain access to commercial materials by:

1. Acting as a clearing house for potential commercial materials
2. Obtaining faculty and student data concerning the quality and utility of commercial material obtained for preview
3. Purchasing, revising (if necessary), preparing evaluation forms, and distributing these materials.

OED collects information from a variety of sources, including faculty recommendations, publishing houses, film libraries, journals, etc., and obtains preview copies of materials which have potential utility. Materials are previewed by faculty who are asked:

- Can this be used as is?
- Can it be used with modification? (If so, OED estimates the additional cost.)
- Where should the material be placed for maximum use?
- What, if any, evaluation needs to be developed for this package?

Appropriate materials are then purchased, modified, if necessary, used with students, evaluated, and revised.

Computer Services

The College has an in-house Hewlett Packard 2000F time share computer system. There are 20 terminals located throughout the College, many of which are moved each quarter, based on instructional needs. A 25-lesson,

self-instructional program is available for faculty who want to learn to program in BASIC, the language used by the 2000F. Printed materials describing additional programs available on the computer, and sign-on procedures are at each terminal. Thirty-two users can be handled simultaneously. The capacity of the computer is 23.5 million bytes of disc storage. The computer is dual purpose, serving the needs of instruction and research in a variety of ways. The computer is used:

- for computer-assisted instruction
- for computer-managed instruction
- to manage data storage and retrieval
- to provide improved methods of analyzing data
- to test students' mastery of information
- to provide drill and practice and simulation experiences for students
- to develop evaluation instruments

Dry Mounting and Laminating

Using the dry mount press, OED can mount flat pictures and specimens on posterboard, and can laminate pictures, charts, tables, drawings, specimens, and other flat material with a clear plastic film.

Graphics

OED provides lettering, technical drawings, drawings of chemical structures and free-hand drawings that can be used for lecture support, classroom projection, tests and laboratory manuals, and for video tape and other media.

Graphic materials can be used to:

- simplify a complex process into a series of steps that are clearly expressed
- illustrate or represent an idea visually

- describe an object or piece of equipment. Often a line drawing of a complex instrument is easier to interpret than a photograph.
- simplify data. Often experimental data can be better understood by an audience when it is put into the form of a simple chart, a graph, or a histogram, rather than a table of experimental values.
- rearrange the parts of an existing visual. Graphic techniques can be used to emphasize one portion of the visual, and to organize a sequence of ideas.
- design visual materials which can most effectively communicate an idea.
- prepare visual materials for slides. Lettering and drawing techniques can be used for more effective lecture slides.
- represent a theoretical concept. Chemical structures are one example of a visual, graphic representation which makes it easier to understand the concepts of processes involved.

Overhead Transparencies

With a thermofax copier, OED can make transparencies in seconds from an original copy done in India ink or pencil. Through a photographic process, Kodalith 8x10 transparencies can also be produced.

Overhead transparencies can be used to:

- provide simple graphic illustrations for lectures. Chemical structures, charts, diagrams, tables and key words may all be put on overhead transparencies.
- aid student note-taking. Students can copy the material on the transparency into their notes. Another alternative, however, would be to provide the students with copies of the material in a handout, freeing them to listen to the explanation, rather than concentrate on taking notes.

- progressively disclose steps in a process, points in a concept, or events in a sequence. A card or paper sliding down a prepared transparency reveals the points you are discussing in the proper order. Students must then concentrate on the point at hand rather than try to copy all the steps before you have finished with the first part of your discussion.
- fill in a table, chart, structure, form, or diagram in class. The blank table or chart can be prepared ahead of time. The instructor can then fill in the information with grease pencil or water-soluble felt tip pen, and wipe it off to revise the same blank form many times.
- face the class and write comfortably on the stage of the overhead projector. Rolls of acetate, which fit on the projector, provide a continuous supply of clean writing surface. Material already written may be rolled back for review. All teaching stations are equipped with overhead projectors.

Offset Press

OED has equipment for printing, collating, and punching paper. The offset press is used to make copies of original typed materials, reprints, experimental laboratory manuals, lecture notes, and specialized charts and tables, when more than 15 copies are required.

Photographic Services

OED has three 35mm cameras, a 4x5 camera, and an 8mm motion picture camera. This equipment can be used to produce:

- 2x2 high contrast (white letters on black background) slides
- 2x2 color slides
- photographic prints for public relations

- black and white prints for inclusion in laboratory manuals, and 8mm magnetic sound films.

Slides can be an effective instructional aid. Except where color slides are needed to show a real object, OED uses high contrast black and white slides. Usually these are prepared from a chart, key words, or other information with black lines on white paper. This is photographed with high contrast film so that the projected image is reversed -- light lines or letters on a black background. One major advantage of high contrast slides is that room lights can be left on while showing these slides. This aids in note-taking, and facilitates discussion. Slides can also be used effectively to pace instruction by building concepts through a series of slides rather than having the entire concept on one slide. This is similar to writing the material on the chalkboard, which tends to pace the lecture, and directs the students' attention to specific points being discussed. OED provides slide trays so these may be permanently kept in sequence. When a presentation or demonstration with slides must be made several times, i.e., a lab demonstration or group lecture, the narration can be recorded, and an automatic synchronization pulse added to advance the slides. OED provides help in developing slide/tape packages, maintaining and revising them periodically, based on evaluative feedback.

Eight millimeter film is more limited in its uses. 8mm film in color is appropriate where the content involves both motion and color. Due to the small frame size, the quality and resolution of 8mm film is less than that of 16mm film or 35mm slides, when projected in large lecture rooms. Therefore, 8mm is more suitable for small conference rooms. If high quality visuals are required, 16mm film or 35mm slides are recommended.

All pharmacy classrooms are equipped for 16mm and 35mm projectors, and have controlled lighting. OED will check out slide projectors, filmstrip projectors, sound synchronizers, and 8mm and 16mm film projectors.

Test Scoring Analysis

OED has two 3M Datronics test scoring machines. One is used independently as a "rover" in the classrooms, and the other is interfaced with the 2000F computer for data analysis. The test scoring machine will grade objective examinations of up to 80 items, indicating the number correct, and edge marking incorrect responses.

The "rover" test scoring machine can be checked out of OED, and used in any Pharmacy Building classroom, lab or office. It is on a wheeled cart for easy mobility throughout the building.

Complete or partial statistical analysis of test results is available through the test scorer/computer system. A package of statistical routines, called Modularized Statistical Evaluation Package (MSEP), has been developed to analyze test data. Refer to the evaluation section for an in-depth discussion of MSEP.

Consultation with faculty on test scoring and interpretation of item analysis will be provided by OED upon request.

Video Tape and Closed Circuit Television

OED has three black and white television cameras, two video tape recorders, one video tape playback unit, and fifteen monitors. Each pharmacy classroom is equipped with television monitors. OED videotapes, lectures, demonstrations, and guest lecturers for later playback and review. TV cameras can be used for image magnification of lab demonstrations and procedures. Video tapes of specific content presentations are often made as an initial

step in project development. Monitors and playback units can be checked out for classroom use, or by individuals.

Video tape can be used to:

- present demonstrations, lectures, simulations, and explain experimental procedures to students. A tape can be replayed to each of many small groups, freeing the instructor from the task of repeating the same lecture many times, and avoiding accidental omission of content.
- allow students to make up lectures and demonstrations they had missed, or review those they did not understand. Tapes can be made available to students through the library.
- evaluate and revise lectures. Video tapes can be made for the private self-evaluation of an instructor's presentation.
- aid OED in project development. The instructor only spends an hour or so making the video tape, and another hour checking the script to produce a well-developed slide/tape presentation.
- compress time. A long experiment can be compressed into a class period, and still present the essential information to students.
- show processes or devices that are too small or too difficult to see as a group. Video cameras can be attached to a microscope to show an entire class the details of a slide. Cameras can be mounted above demonstration tables to allow each student a close-up view.
- record the presentation of guest lecturers, so that future classes may see their presentation.
- record the future lectures of an instructor who must be out of town, or absent.

Educational Development Projects

An OED project has a clearly defined beginning and end, undergoes a series of developmental steps and usually results in a tested unit(s) or module(s) of instruction. A project includes more than simply developing a series of slides or transparencies, although a project may often incorporate media as a presentation device. Most projects have primarily focused on the development of instructional methods. Curriculum interfacing and evaluation are usually critical steps in the development of instructional methods.

The process for developing projects has evolved into eight stages: idea, rough draft, final draft, production, testing, revision, evaluation, and recycle.

Ideas for projects come from several sources. Ideas are often initiated by faculty members. Most grow out of a teaching problem, and several of the projects are the result of service activities. Ideas for projects may be generated informally by the OED staff in conferences with faculty members or at faculty and committee meetings. Occasionally one faculty member will suggest that another faculty member needs help, especially in team teaching situations. Ideas are nurtured through discussion and observation of current practices.

At the next stage, rough draft, a video tape, if appropriate, of current teaching techniques (such as a laboratory demonstration) is made. In other cases existing materials that the faculty can pull together, such as text materials, reprints, rough lecture notes, and examinations are reviewed. On occasion student notebooks are also reviewed at this stage to see how well students are understanding the professor's intent and are transcribing information accurately. This technique is often quite revealing. After reviewing current instructional materials and practices, the problem to be addressed is conceptualized. The objectives for the project are discussed and a rough draft for

implementing these objectives is developed.

At the third stage, final draft, a plan of action is determined. Printed materials are produced and if media are to be used, scripts for slide/tape presentations, audio tapes, video tapes, etc. are written. If necessary, computer support capabilities are designed. Since OED would rather buy and modify existing materials, a search for commercially available instructional packages is made at this point. The fourth stage is production. Media are designed and developed and artwork, reproduction, and packaging for printed materials are accomplished. Computer programs may be written at this stage.

The fifth stage is developmental testing. The product or method is tried out on a selected group from the target population. Evaluation procedures are designed to collect information for improvement. Students are sometimes hired for developmental testing since a great deal of feedback is required for revision.

The sixth stage is revision. Based on the feedback received from developmental testing, the product or method is revised. Specific and detailed information is used for product revision which at this point is sometimes extensive.

The seventh stage is evaluation. At this stage, the product or method is used by an entire class or the target group for which it was designed. Evaluative information on the quality and impact of instruction is collected. Data on student evaluation of teaching, student performance, and achievement of objectives is collected along with specific comments for further improving the product. The eighth stage is recycle. The product or method is again revised for the next group of participants based on the evaluation data. The last two stages are usually repeated each time the class is taught for several years.

As can be seen from the description of stages, use of any model in practice is not a linear process but rather an iterative process. Stages are repeated

and merged into other stages as required. Not all steps are used for every project. The tendency to provide evaluation is increasing as more systematic, useful and simple evaluation procedures are developed by OED's evaluation component.

About forty projects have been completed since OED began. Projects range considerably in type, scope, and development time. The projects completed to date can be classified, somewhat arbitrarily, by the purposes addressed and media used. A project can be accomplished for 1) supporting an existing course, 2) developing an entire course or 3) supporting an aspect of the Pharmacy curriculum. The media used in projects can be, 1) audio-visual materials, 2) printed materials, 3) the computer or some combination of these three media.

Course Support Projects

One purpose of educational development is to improve a part of an existing course. Projects for this purpose are referred to as course support, since the existing course is not drastically changed but rather modified through new instructional methods, better instructional materials, or improved examinations. Some projects emphasize improved use of audio and visual materials in courses such as, slides, films, audio tapes, transparencies, and video tapes. A second group of projects emphasizes the improved use of printed materials in courses such as, lecture support materials, student study guides, and improved tests. Many projects use both visual media and printed materials. A third group of projects emphasizes the use of the computer in courses through preview exams, simulation of professional practice experiences and statistical packages for analyzing laboratory data. A total of twenty-one projects can be classified as course support.

Course Development Projects

A second purpose of educational development is to improve or develop an entire course. These projects are referred to as course development projects, since content and the methodology can be substantially changed. Fewer projects fall into this category but the amount of time and resources spent on each project is greater. The impact of the project on the quality and efficiency of instruction is measurable. Considerable time also goes into refining course development projects once they are in operation. One course development project in Natural Products Chemistry utilizes both mediated and printed materials to enhance lectures, upgrade course readings, and introduce new instructional methods. Another project which emphasizes use of printed materials is a curriculum development project which used PERT charting to determine optimal

management strategies.

By far the most innovative and time consuming course development projects are those which utilize the computer as well as printed materials. Two projects fall into this category. One project developed computerized problem solving and test exercises for the Pharmacy Calculations course. This is supported by modularized printed materials and a weekly review session. Another project adapted commercial materials for use with computer-managed instruction in Introduction to Disease. This course is modularized into 14 self-instructional units. The computer assigns 1 of 3 alternate post-tests for each of the 14 units to each student. The computer keeps track of all students' scores, and uses their best score for each module for assigning final grades. A total of six projects can be classified as course development.

Program Support Projects

A third purpose of educational development is to improve the climate for learning in the college environment. This includes improving the use of the library and other college services, developing objectives or analyzing curriculum for a program area, assisting in public relations for the college, developing materials that are useful for multiple courses, developing data analysis programs, and developing information storage and retrieval systems. A total of ten projects can be classified as program support.

Outstanding Projects

Some outstanding projects which have been highly acclaimed or widely used include the Pharmacy Calculations Course, the Modularized Statistical Evaluation Package, the Poisonous Plants Slide/Tape, and the supplementary materials developed for the Natural Products Chemistry Course.

The Pharmacy Calculations Course solved an instructional problem. Materials

that were only minimally retained by students were changed into relevant, efficient, self-instructional materials with computer support.

The Modularized Statistical Evaluation Package has been successful, both inside and outside the College. The development of this computer program responded to a need for immediate item scoring and analysis of examinations. This computer program uses a test scoring machine as an input device to transfer test data directly to the computer for analysis. This saves time, and reduces errors from the traditional method of transferring data to key punch cards. This innovative use of a test scoring machine has become a major selling point for the vendor of this equipment.

The Poisonous Plants Slide/Tape shows common poisonous plants at various stages of growth. The slide/tape is frequently used outside the College of Pharmacy by alumni, youth groups, church groups, garden clubs, and other community organizations.

The Natural Products Chemistry Course involves many chemical structures which the students are required to learn. Traditionally, these structures had been presented with the aid of the chalkboard. Upon examination of student notebooks, it was obvious that a more expedient method of presenting this complex notation was needed. To provide students with more accurate lecture notes, and to give students more class time to attend lectures, a comprehensive and well-designed set of handouts was developed. These are distributed to students in booklet form. Space for taking additional notes during lectures is provided, so that students can keep all their materials together. Slides have been developed to aid in the presentation of the material. This technique has been very well received by the students. Two other instructors are currently preparing this type of lecture support materials for their courses.

OED has had a high success rate with projects. Many more ideas for projects are discussed than are actually implemented. Those projects that have passed the idea stage have been rated as useful by both the instructors and students.

Problems in Project Development

One primary problem exists in project development. Many projects are faculty dependent, and cannot be used successfully by other faculty members, or in other colleges of pharmacy in their current form. Most instructional development projects are supplemental to a course. They rely on the faculty member to provide additional material.

This is a difficult problem to solve, since, in order to be maximally useful to a faculty member, projects must be based on a particular instructor's needs and teaching style. Instructors in higher education are highly individualized in their teaching style and choice of content. Sharing of packaged instructional materials at this level, unless done with close communications during development, is usually a problem. One approach to solving the problem which OED emphasizes, is to develop modules of instruction at several levels of depth. Then individual instructors at other institutions can use those modules which are important to their needs and goals.

OED has emphasized this approach in the refinement of two courses, Pharmacy Calculations and Introduction to Disease. These courses, although modularized, still have limited transportability, due to their hardware requirements. Both are developed for use on the Hewlett-Packard Computer system, and would have to be modified for use on other systems. A more desirable and less costly approach to solving this problem is to develop instructional materials jointly with other pharmacy colleges. Several faculty

members in the same content areas across institutions would make input concerning content and instructional strategies. The institutions would share production and development costs.

Another problem experienced in project development is the short-term use of student-initiated projects. Although several groups of students have put tremendous energy into developing projects, such as the Drug Abuse Film and Hospital Pharmacy Course, these projects are seldom carried on after the responsible group of students leaves.

Another problem in project development is keeping projects going, once initiated. There is always the tendency for development efforts to lag as other responsibilities and activities crowd the faculty member's schedule. It is important for projects to move along quickly enough to maintain the faculty member's interest. One technique used to maintain a high level of interest is to have faculty present their projects briefly in faculty meetings.

OED puts a premium on individual faculty members' expressed needs and interests when designing instructional projects. There is constant consultation between OED and the faculty member during development to insure that the product satisfies the needs of the professor and the content. This greatly increases the use and endurance of instructional changes, but it limits the total impact of OED on instruction, since these activities have primarily been implemented as a series of small projects. OED has consciously worked on smaller projects rather than large systemic changes in pharmacy education. This means essentially that more changes occur in teaching method than content. This means that changes tend to have a lesser impact on pharmacy education nationally, but tend to be more accepted and enduring and less demanding of time, money, and typically produce observable results. This seems to be an appropriate choice for the College of Pharmacy at The Ohio State University,

because the content and interrelationships of courses is already highly sophisticated. Future directions for OED, however, indicate that more emphasis will be placed on broader based changes in pharmacy education at The Ohio State University.

Problems in the Support Services Area

OED was reviewed by an external evaluation team who observed the operation and interviewed faculty for two days in 1974. The evaluators felt although OED was satisfying many needs in the College, they were over-emphasizing the service function and may be "sub-optimizing". The emphasis on service may be counter-productive to overall development activities, if the other elements of educational change are under-emphasized. A reference was made to a faculty member who developed a large number of slides for use in instruction, without improving other areas of the course. The development, although meeting support service goals, did little toward improving the total course. OED is aware of the problems inherent in over-emphasizing one aspect of education development. The OED model, stated goals, and priorities reflect their concern with promoting a balanced approach to improving instruction. Yet, there is still a tendency toward over-use of the service function by the faculty. OED continues to work with faculty to develop projects in the areas of curriculum evaluation and instructional methods.

A problem in support services is the job back-logs that sometimes occur from OED's open door policy. Since supplies and equipment of OED are used by the faculty for their own publications, by graduate students for their research presentations, and as a service unit for the College, as well as for OED projects, the system sometimes becomes over-loaded. OED's open-door policy, however, allows individuals to help themselves, as well as providing service to the total faculty on a relatively short turn-around basis.

Since many of the OED support services depend on equipment, equipment must be kept in good condition. Equipment malfunctions and preventative maintenance are addressed continually.

OED has considerable expensive equipment, so attention must also be given to maintaining security. OED has had very few problems with missing equipment, but since the pharmacy building is used by several hundred non-pharmacy college persons each day, and equipment is used throughout the building, extra care must be taken.

Summary of Support Services

OED provides support services in many areas, including audio services, commercial materials selection, computer services, dry mounting and laminating, overhead transparencies, duplication, photographic services, test scoring and analysis, and video tape and closed circuit television. In addition, recruitment, tutoring, study skills, orientation and personal counseling are provided for students.

It is important to note that the critical part of the support service is not the hardware but rather the quiet, constant consulting by the educational development faculty that result in the acceptance of the media, the preparation of improved teaching materials, and the adoption of teaching strategies that help the student learn more effectively. For this to occur, a high quality service must be maintained to keep equipment functioning and produce educational materials with short turn-around times.

Summary of OED Projects

OED provides both support services and project development in curriculum, evaluation, and instructional methods. The typical project is initiated by a faculty member to develop printed, mediated, or computerized support materials for his course, and requires about 6-10 months to complete. Some of the beneficial and time-consuming projects have involved the development of entire courses. Development of projects usually requires eight stages,

progressing from an initial idea to a final revision.

Although highly successful on home ground, the methods and products developed with faculty members are not easily used by other professors or universities. This makes the cost of development fairly high. If instructional materials are modularized or jointly developed by several universities, their scope of use increases. OED projects are faculty-oriented. When a faculty member leaves, the project often goes with him. This has proved especially true with student-developed projects. OED has consciously chosen to emphasize "how to teach" rather than "what to teach", since the latter is viewed as the domain of the teaching faculty.

Student Support Services

Improving support for teaching is necessary but not sufficient. OED felt that it was also necessary to provide support for students. Student support services include recruitment, tutoring, study skills referral, orientation, and personal counseling.

Recruitment

In 1970, the College of Pharmacy at The Ohio State University was in a position similar to many other colleges, in that potential enrollment capacity was not being met. Subsequently, a full-time recruiter was hired to develop and operate a system of recruitment to recruit more and better students from the State of Ohio. This system included the development of materials such as brochures, slide/tapes, posters, targeted mailing lists and new personal contacts, plus a coded pre-paid post card evaluation system to see which strategy obtained the most requests for application materials. By 1972, entering students exceeded capacity. In addition, a Special Project Grant was awarded in 1972 to enhance minority recruitment efforts. Currently, the College has two three-quarter time and one half time personnel for recruitment activity. This staff also coordinates and provides support services to retain students after enrolling, such as tutoring, study skills, and personal counseling.

Tutoring

Tutoring services are provided for students so that they can receive help in specific courses. The marginal student, especially, is apt to be caught in the vicious cycle of learning just enough to go from one class to another. It has been demonstrated, particularly with the traditional midterm/final exam schedule, that students can survive in school while staying ignorant

about some of the basic concepts in science. In addition, there are times when both the average and above average student could benefit, if a knowledgeable person were available to answer questions and provide direction.

The objective of the tutoring program was to develop a system whereby any student wanting academic assistance could make contact with an appropriate tutor, without embarrassment, and at little or no cost.

Tutors are obtained primarily by recommendation of faculty to work in a particular course. Both undergraduates and graduate students are employed at the prevailing tutoring wage which is currently $5.00 per hour. The College pays 80% of the tutoring expenditure and pays all expenses of students who cannot afford to pay. During Autumn, Winter, and Spring quarters of 1974-75 approximately 1200 hours of student-tutor contact were provided. Services were provided by 78 tutors to 148 students during this time period. Certain key courses were covered with small group tutoring where tutors were limited and the demand high. Most tutoring occurs in chemistry and pharmacy courses which emphasize chemistry. Tutoring is also provided for math, physics, anatomy and physiology.

Evaluation of this service indicates high acceptance by students and faculty. Training of tutors is important for the student to receive maximum benefit. Currently, alternatives to the labor intensive tutorial process are being explored in order to reduce costs of the program.

Study Skills

A full-time graduate assistant from the psychology department provided group study skills counseling for students in 1971-72. A study skills course was also provided in Autumn of 1974. Currently students are directed to enroll in a university class designed to teach improved study skills which is

offered for elective credit. This course deals with reading speed and comprehension, techniques to help the student organize his time more efficiently, and training the student in how to take tests such as essay and multiple choice.

A diagnostic chemistry test is used to identify students' weak areas in chemistry. Remedial lessons in inorganic chemistry are available on the College computer. Remedial lessons in organic chemistry are available on the University's Computer Assisted Instruction system.

A battery of achievement tests measuring reading, math, and problem-solving skills as they relate to Pharmacy is administered to entering students. The testing program is currently being validated. Eventually results from these tests will be used to channel students with weak areas to remedial materials and programs.

Summer Science Training Program

The student services area hosts a Summer Science Training Program for high-caliber high school students. About 24 high school juniors usually participate in this orientation to pharmacy through involvement in courses, laboratories, field trips and discussions for one week.

Personal and Financial Aids Counseling for Minority Students

Personal counseling for minority students is provided. In 1974-75 there were 11 minority students and there will be 19 minority students in 1975-76. In 1974 a special peer-counseling program for minority students, in which students were paid $3.50 per hour, was provided. Financial aid information about available scholarships and fellowships is also provided.

OVERVIEW OF THE PROCESS OF EDUCATIONAL DEVELOPMENT

OED has been successful in helping to bring about changes in the instructional techniques used by many of the Pharmacy Faculty. This section of the report discusses:

A. OED's Change Process. The philosophy and techniques used by OED to help faculty modify their teaching styles and try new instructional methods are discussed. Carefully planned approaches are used by OED to facilitate educational change.

B. Outcomes of Educational Development. OED has attempted to achieve predictable outcomes that have impact on both the teaching and the learning process. The outcomes of OED's efforts to improve the educational climate affect both instructors and students.

C. Faculty Evaluation of OED. Nine faculty members, approximately 25% of the faculty, were interviewed in order to determine the faculty's response to OED. Results from the interview provide information concerning faculty use of OED, perceived effectiveness, success in meeting objectives, and recommendations for beginning similar efforts in colleges of Pharmacy.

D. Future Trends for OED. Based on its five years of experience, changes in funding, re-organization, and evaluation results, OED foresees various immediate and long range trends for its future.

OED's Change Process

The OED change strategy revolves around a collaborative change model. Collaboration is reflected in both OED's interaction with faculty and the interaction among the three OED components.

A collaborative interaction with faculty members essentially means that OED and a faculty member work together to define an existing problem, usually identified by the faculty member. The problem is redefined until both individuals have a clear understanding of the dimensions of the problem. A problem may initially be defined by a faculty member as "low student ability". Through discussion the problem may be redefined as "students are taking inadequate lecture notes". Once a problem is clearly defined, development work begins. Projects essentially belong to faculty members. OED provides resources, consultation, and personnel.

Collaboration among the OED faculty is also an essential part of any development project. The three component leaders are constantly aware of how they can involve one another on any project. Most projects involve all three components to some extent. The personalities of the OED component leaders are well matched for facilitating collaborative efforts. Dr. Hudspeth is an optomistic, creative, divergent thinker, who has lots of ideas for what should take place. Dr. Krautheim is a practical, action-oriented, convergent thinker, with highly developed technical skills, who primarily focuses on what can take place. Dr. Carlson is in between, with an orientation both to ideals and practicality. The OED faculty have learned how to use each other's strengths and skills to develop sound projects.

OED's change process also emphasizes the use of five sequential phases

stages identified by Havelock* as: awareness, interest, trial, evaluation and adoption. The derivation of these stages is based on a review of the change process in agriculture, education, and other fields. Research has indicated that an individual needs to progress through each of these stages in sequence, in order to significantly change behavior.

OED encourages faculty to initiate projects and use OED services by building faculty awareness of instructional options and the role of OED. Faculty awareness is accomplished in a variety of ways:

1. An orientation to OED services and functions is arranged for new faculty.
2. A bi-monthly one-page newsletter, "Emphasis on Teaching", is distributed which summarizes the salient features of a new teaching technology (e.g. individualizing instruction, team teaching, learning modules, etc.) or provides some helpful teaching hints. Dr. Krautheim describes the newsletter as "something a busy faculty member can scan between the mailbox and the trash can." A recent evaluation of the newsletter indicates that most of the faculty read the newsletter and feel that it has been useful in building their awareness of educational options for their courses.
3. OED personnel have frequent informal interaction with faculty where problems are discussed, or ideas for improving courses are germinated.
4. Faculty are kept informed of on-going projects of other faculty members through faculty meetings and a Dissemination Brochure.
5. An OED Faculty Handbook describes all the OED services, and suggests a variety of ways that each service can be used to improve current teaching practices.

* Havelock, Ronald G. ...Institute for Social Research, University of Michigan, Ann Arbor, Michigan, 1972.

6. OED helps faculty obtain information about innovations tried in other schools of pharmacy and allied health, and provides input about findings in educational research and new educational technology.

OED stimulates faculty interest in trying a new teaching technology or working on a problem area in their course or teaching practices in several ways.

1. Occasional guest lecturers and consultants are brought in to provide in-depth information on an instructional option.
2. Short seminars and demonstrations of new services offered by OED, or new technologies available, are scheduled for interested faculty.
3. OED helps faculty collect and use Student Evaluation of Teaching Data as an information base for improving their courses and teaching strategies.
4. OED helps faculty analyze and improve their examinations as an information base for improving courses and teaching strategies.
5. OED helps faculty locate and obtain commercial materials that can be used in their courses.
6. Ideas for projects that will save faculty time, or make coverage of content more efficient, are often suggested.

OED encourages faculty to become involved in the development process. Active participation by faculty is viewed as a prerequisite to developing a useful product. Faculty trial of new techniques and products is encouraged in several ways.

1. OED encourages "hands-on" participation from faculty members who want to learn more about writing their own computer programs, making slides, and so on.
2. A diversified support system for teaching is provided for faculty.

The accessibility of slides, transparencies, tapes, etc. encourages faculty to try out media that they probably wouldn't use if they had to travel across campus to obtain them on their own. The support system also serves as a vehicle for larger changes, since faculty become more interested in improving their courses after trying out a few small changes.

3. OED most often works in a quiet way with individual faculty members and quickly provides them with something that is useful.
4. An open-door policy for faculty is maintained so that OED personnel are easily accessible to discuss ideas and provide services.
5. OED facilitates institutional rewards for faculty members who conscientiously work on the improvement of instruction.

OED helps the faculty to evaluate instructional changes before, during, and after they occur. OED attempts to make evaluation an essential part of change. This is accomplished in several ways.

1. New educational ideas are discussed with key faculty members who are representative of the entire faculty.
2. When a faculty member begins working on a project for a course his reactions to each step in the development process are solicited, so that the outcome will be what the faculty member desires for his students.
3. OED assists faculty with the collection of information on how well instructional changes meet their intended objectives, and make the instruction more efficient and/or more effective.
4. Information about projects is discussed in meetings and interested faculty are encouraged to visit courses and discuss the strategies used by their colleagues.

Faculty adoption or use of new products and methods after they are developed is the end point of educational development. When the adoption rate is high, projects are designed toward the objectives the instructor has in mind, and the interest and active participation of the instructor is maintained through frequent solicitation of ideas and comments. The highest quality, most well conceived, educational products may fail unless they are adopted and consistently used by an instructor. Since instructional innovations developed through OED are owned by a professor, they tend to be used for a longer period of time than an innovation that comes from the outside.

OED encourages a climate for experimentation and change among faculty by:

1. Maintaining strict confidence of information.
2. Performing their role with professional competence.
3. Avoiding coercive tactics and aggressive attempts to change faculty behavior.
4. Encouraging faculty development of projects supported by the OED services.

Outcomes of Educational Development

The ultimate goal of educational development is to improve the climate for student learning. If effective teaching is provided, students are more apt to seek knowledge and continue learning after their formal education ends. Educational development can focus on various dimensions of the learning process. For example, it can be used to make instruction more efficient, more interesting, more effective, better matched to students' needs, or more rewarding. Improved instruction influences both students and faculty. OED has worked toward the following teaching and learning outcomes:

Teaching Outcomes

1. Awareness of the possibilities for improving instruction.
2. Ability to use available resources for improving instruction.
3. Assistance with some tedious duties (grading exams, maintaining grade records, repeating lectures, chalk board illustrations, etc.)
4. Easier access to teaching support services and materials.
5. Access to information for improving teaching (student evaluation of teaching, diagnostic data on students, knowledge of educational research, and innovations)
6. Increased self-sufficiency in improving instruction.
7. More skillful use of media.
8. Improved teaching practices.
9. Improved tests.
10. More efficient coverage of information.
11. More consistent/accurate presentation of information.
12. Instruction that is better matched to profession's requirements.
13. Instruction that is better matched to students' needs.

Learning Outcomes

1. Increased opportunities for individualized instruction.
2. More immediate feedback from exams.
3. Assistance with some tedious duties (notetaking at lectures, studying for exams, analyzing lab data, etc.)
4. Diagnostic feedback on strengths and weaknesses.
5. Access to remedial instruction and tutoring.
6. Better study aids (preview exams, study guides, class handouts, more accurate notes)
7. Better retention of information.
8. More efficient learning.
9. More challenging instruction.
10. More information to students in the same amount of time.

See the Faculty Evaluation of OED for the faculty's opinion on how well OED has attained these learning and teaching outcomes.

Faculty Evaluation of OED

Sample

Ten* Pharmacy professors were randomly selected from a population of 36 faculty members at the O.S.U. College of Pharmacy for personal interviews. Each professor was asked a series of questions about his use and opinion of OED. The sample seems to be a representative group of the College.

The sample included both undergraduate, graduate and continuing education faculty, some who had been with the College for a little as one year and others for twenty years, and faculty involved primarily in college administration, as well as faculty involved in teaching.

Methodology

One hour interviews were scheduled with each of the selected faculty members. An interview schedule which utilized both forced choice and open-ended items was used. Two interviewers conducted the interviews over a 3-day period. Both interviewers were not regular OED staff members, and did not know the faculty. The faculty was assured of the confidentiality of their responses and was encouraged to respond candidly.

Summary

All interviewed faculty felt that OED was useful and had provided a beneficial service to the College. All interviewed faculty had used OED services at least once and almost 70% had been involved in an OED project on which they worked an average of 100 hours. The six most used OED services by faculty are: offset printing, student evaluation of teaching, test scoring, audio services, production of black and white slides, and developing curriculum objectives.

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* One faculty member was in the midst of moving and was unable to complete an interview before leaving. This reduced the sample to nine.

Interviewed faculty felt that in terms of its original objectives, OED has been most successful in establishing instructional development and support services activities in student recruitment, and evaluation. Lower levels of success have been achieved in revising and updating curriculum.

All the interviewed faculty recommended that other colleges of pharmacy adopt some type of educational development capability. Twenty per-cent felt that other colleges should adopt an educational development effort, even if to a lesser extent.

In terms of improving the teaching-learning process, interviewed faculty felt that OED has had the most impact on the teaching activities of faculty in providing easier access to support services and materials, assisting with tedious teaching duties, and increasing faculty's access to information for improving teaching. Faculty felt that OED has had the most impact on student learning in providing students more opportunity for individualized learning, access to remedial instruction and tutoring, and making student learning more efficient.

When asked about OED's future focus given their reduced funding as of July, 1975, faculty were divided equally as to the most essential services and functions OED should perform in the future. Five of the nine interviewed faculty felt that OED should focus more on curriculum development and evaluation and less on media services. The other four faculty felt that OED should focus more on providing teaching support services. Many useful recommendations for improving OED were provided by faculty. (Refer to the interview results for a comprehensive listing of faculty recommendations.)

The six least used OED services by faculty are video tape, questionnaire development, reviewing the files of commercial curriculum materials, producing slide-tapes, and dry mounting and laminating.

Results

The responses of the faculty to each question are presented below.

1. *Roughly estimate the extent to which you have used the following OED services during the past 5 years. Extent refers to either the frequency of use or the amount of time spent using a service.*

0	1	2	3
Not used	Seldom/or little time	Occasionally/ or fair amount of time	Frequently or much time

The frequency of the varying amounts of use of each service was computed. Services were then placed in rank order to display the most used to the least used service for each area of educational development (curriculum, instruction, and evaluation) as rated by faculty. Ties are illustrated by taking the average of the items which received the same number of responses.

CURRICULUM

1 developing course objectives

2 developing new curricula product(s)

3 analyzing course content

4 developing new course(s)

5 reviewing files of available commercial materials

EVALUATION

1.5 test scoring

1.5 use of student evaluation of teaching services

3 project evaluation

5 use of Modularized Statistical Evaluation Package (MSEP) for test analysis.

5 construction or improvement of exams

5 consulting in statistics and/or measurement

7 use of test scoring machine in the classroom

8 use of Computerized Individualized Student Evaluation of Teaching

9 questionnaire development

INSTRUCTION

1 printing (offset)

2 audio services

3 slides (black & white)

4 overhead transparencies

6 computer applications

6 photographs

6 slides (color)

8 graphics

9.5 dry mounting or laminating

9.5 slide tapes

10 video tape

2. Have you completed (an) OED project(s)?

6 Yes 3 No

a. If Yes,

(1) How many projects?

The median number of projects completed by the six faculty members who had completed projects was 2 .

(2) Estimate the total number of manhours you spent.

The average number of manhours spent by a faculty member on OED projects was 100 hours .

(3) Grade the overall success of each project.

A B C D F

The rating for overall success of projects ranged from A to D. The average grade was B.

b. *If no, why?*

The 3 faculty members who have not completed OED projects gave several reasons why:

1) The type of courses I'm teaching don't lend themselves to projects.

2) I don't teach undergraduate courses.

3) I don't have time.

Two of the three faculty members who had not completed projects had initiated projects which were not completed.

Reasons for not completing projects were:

1) I'm working on one now.

2) I tried to initiate something, but OED never did their part.

3. *Grade the overall effectiveness of OED in improving pharmacy education in this College.*

A	B	C	D	F
3	5	1	_	_

The average rating for effectiveness was 4.2.

4. *Rate OED's degree of success in meeting the following original objectives:*

1	2	3	4	5
POOR	*FAIR*	*GOOD*	*VERY GOOD*	*EXCELLENT*

The mean response for each item is presented.

3.5 *Establish and operate an Office of Educational Development in the College for the purpose of planning, developing, implementing, and evaluating educational change.*

4.5 *Establish an instructional development and support service for the optimal use of instructional materials and techniques.*

2.4 *Systematically revise and update curriculum.*

3.4 *Develop a capability to permit proper evaluation of both present and proposed educational activities within the College.*

4.1 Devise and implement recruitment activities with a goal of increasing enrollment.

5. How strongly would you recommend other colleges of pharmacy to adopt some type of educational development capability? (Check the one best response).

The number of faculty who selected each option is presented.

4 Very strongly

3 Strongly

2 With a few reservations/qualifications (What are they?)

If you get quality staff equal to those we have here who are proficient at closing the gap between the social and physical sciences.

No model should be superimposed on another college - should be adopted differently in every situation.

Educational development activities should be kept in the background. The staff should be consultants and support ongoing processes rather than imposing large changes.

Better to have a regional educational clearinghouse for several colleges rather than an OED at every college.

0 With many reservations/qualifications (What are they?)

0 Not recommended

6. Rate the amount of impact OED has had on improving the teaching/learning process in the following areas:

0	1	2	3
No impact	Little impact	Some impact	Much impact

The mean ($\bar{x}$) and rank order for each is presented.

RANK	$\bar{X}$	TEACHING
1	3.0	Easier access to support services and materials.
2.5	2.6	Assistance with tedious duties (e.g. grading exams, repeating lectures, etc.)
2.5	2.6	Access to information for improving teaching (e.g. Student Evaluation of Teaching, diagnostic student data, knowledge of educational research and innovations).

5	2.4	Awareness of possibilities for improving instruction.
5	2.4	Ability to use available resources for improving instruction.
5	2.4	Improved teaching practices
8	2.1	Skillful use of media
8	2.1	Improved tests
8	2.1	More efficient coverage of information
10	1.6	Instruction that is better matched to students' needs
11	1.4	More consistent/accurate presentation of information
12	1.3	Instruction that is better matched to profession's requirements

RANK	X	LEARNING
1	2.4	More opportunity for individualized learning
2.5	2.3	More efficient learning
2.5	2.3	Access to remedial instruction and tutoring
4.5	2.1	Assistance with tedious duties (note taking, studying for exams, etc.)
4.5	2.1	Better study aids (accurate notes, handouts, preview exams)
6	2.0	More interesting instruction
7	1.9	More information to students in the same amount of time.
8	1.7	More immediate feedback from exams
9.5	1.4	Diagnostic feedback on strengths and weaknesses of students
9.5	1.4	Better retention of information

7. *Given OED's reduced funding as of June 30th, 1975, what do you think are the most essential services and functions OED can perform in the future?*

Should work with faculty in developing courses and continue audio-visual support.

Curriculum development has to be the most important. This is unique to OED. The other services could be gotten somewhere else on campus. The evaluation function needs to be improved. I'm tired of SET. Support services should be continued on a more limited scope.

Focus on increasing the number of alternative educational approaches used.

The duplicating services are invaluable. It is very convenient to have all these services here - really benefits the instruction too. Use of the computer, although good, may have to be cut down with a reduced budget. OED should emphasize services not innovative educational alternatives.

Assist our teaching program and curriculum.

Focus on curriculum and evaluation. Hire someone to do the A-V stuff.

Maintain teaching aids. Do statistical studies on current students and graduates. Construct and analyze tests and evaluate courses.

Provide external support for optimizing the learning function.

Prioritize the allocation of resources for instructional development, so that the newest faculty or least experienced educators receive the most assistance. Put more resources into curriculum development.

Use more non-professional staff for performing the more technical educational development functions.

Continue to prepare audio-visual materials, provide off-set press services, and evaluation and test analysis services.

Focus on curriculum development and course development. Many support services activities can be done by individual professors. OED should also be working on objectives, improving test, and evaluation of courses.

8. *Do you have any recommendations for improving the operation of O.E.D.?*

1. Students should help generate items for Student Evaluation of Teaching instruments.

2. Minority retention programs should be improved.

3. OED should be more aggressive in working with faculty.

4. Need programs to involve faculty more.

5. Need more involvement from students - OED should more aggresively pursue student involvement.

6. Need program in "how to teach" for new faculty and graduate students.

7. Need to develop voluntary program in faculty development to help faculty:

   evaluate themselves
   develop courses
   improve teaching skills

   a. OED should try didactic classes rather than spending so much time one-to-one.

8. OED should work more to change student attitude. (Students are dismayed that faculty is so highly qualified). Use evaluation to find out more about student attitudes and how to make them more positive.

9. The instructional methods are great and have my support.

10. Need to shift from student evaluation and the type of evaluations used to date to a mechanism for improving legitimate evaluation of teaching materials and aid faculty in evaluating how the teaching is working.

11. Need to further clarify what is done in evaluation, how information is used, how it helps development -- through a document or seminars.

12. Faculty is unaware of many educational alternatives- Seminars are needed on the educational process and learning, and the best way to get material across to students.

13. More emphasis on new techniques for improving instruction (e.g. Computer-Assisted and Computer-Managed Instruction).

14. Need an in-house program on what has been done using successful OED projects. Like to hear what Pharmaceutics has done in detail, and how this might apply to other courses. Should be done at least one a year. Summer is a good time.

15. Need more consultation service. OED staff needs to make themselves more available.

16. Evaluation is getting out of hand - particularly curriculum evaluation. Some Student Evaluation of Teaching (SET) forms are devisive; SET questions are sometimes biased - not impartial.

17. Faculty perceived OED as coming to make drastic change. They need to be somewhere in-betweer small and large changes.

18. A pharmacy specialist would be useful as an OED staff member.

19. Like to have full-time graphics personnel.

20. OED needs to begin with a "macro" approach - get curriculum revamped and then get to the instructional services area.

21. Need curriculum specialist on OED staff with B.A. in Pharmacy, M.A. in Administration, and Ph.D. in Educational Development.

22. By its design OED has slighted curriculum development. Could have used one more entire staff to spend time with curriculum development. Should have spent more time examining the appropriateness of the Curriculum.

23. OED tried to influence curriculum at the outset but their efforts were thwarted. Now there is a strong push for curriculum development by faculty. It is quite controversial and in need of attention.

24. Need more centralized, better controlled duplicating services for entire college.

25. Need more emphasis on improving graduate education.

26. Good instructors improve courses that are already good. The weak instructor does not seek out help. There is no good way for OED to grab hold of the poorer instructors and help them improve their teaching style and courses.

27. Make orientation and training in educational development a pre-quarter requisite (similar to requirement) first faculty meeting of the year.

28. I'm very disappointed that OED felt the grant was written only for undergraduate instruction. I wanted OED to also focus on other education concerns of the college.

29. OED started with a low profile and have had a hard time changing their image to include more sophisticated types of educational development.

9. *General Comments about OED.*

Done what it was designed to do.

Been very helpful.

They've stimulated a lot of thought.

Been able to oil some of the rusty wheels - at least get them agitated.

Overall I've enjoyed working with the OED personnel.

Provides an alternative view - not always the only way - but its good to listen and incorporate a few of these things.

Dr. Krautheim interacts very well with the faculty. He doesn't threaten faculty but still gets his points across.

Has been a shot in the arm for the instructors - but mainly at the "micro" instructional devices level.

Their contribution has been rather sizeable.

Its lived up to our expectations and possibly gone beyond.

How was I selected? I've used OED probably the least of anyone.

I respect their effort and their ingenuity in knowing and using related activities and resources across campus.

We are really wasting our time if we are teaching the wrong thing but teaching it better.

Do you invest in an OED or in putting research scientists behind pharmaceutical counters to see what it really means to be a practicing pharmacist? Maybe then we will improve the quality of education. It's a close tradeoff.

Has improved A-V area tremendously. Testing has improved to a high level. But little improvement has occurred in the curriculum area (OED has tried but met with much resistance - can't grade them on intent though.)

Item analyses are so useful for me.

They provide a valuable service.

Overall I'd give OED a favorable rating.

Future Trends For OED

Since OED has reached the end of its five-year involvement as a Special Project Grant Program under HEW, the OED faculty foresee several trends for the immediate future:

1. More emphasis on project development and less emphasis on providing services.
2. More emphasis on curriculum development and evaluation and less emphasis on instructional methods.
3. Reduction of the services offered so that the quality of services remains high and the volume is lower. Some less used services that can be obtained elsewhere in the college or university will be deleted. Faculty will be asked to become more selective in what they ask OED to do.
4. Reduction of the OED faculty and staff. OED will lose one faculty member, the manager of production services, and 1/2 time computer specialist.
5. Reduction in the purchase of materials and supplies. Needed software will be rented rather than purchased when possible. Supplies will be less plentiful and used primarily for project related work.
6. Plateau of computer use. Emphasis will be placed on maintaining and utilizing existing computer programs rather than developing extensive new programs.
7. Preparation of proposals requesting funds for specific instructional development projects.
8. More emphasis on in-service education workshops, seminars, colloquia, and retreats for faculty where educational development topics are discussed and put into practice.

Long range goals for OED include:

1. Collaboration with other colleges of Pharmacy to make joint efforts for improving pharmacy instruction.
2. Increase in the research capability so that more research can be conducted in areas, such as educational policy, comparing educational methods, analyzing teaching-learning process, and analyzing trait-treatment interaction.
3. Use of OED as an externship for students in education at Ohio State. Students can work on short term educational development projects for course credit.

RESOURCE REQUIREMENTS

The type and amount of resources needed by an educational development unit depend on its size and goals. A relatively high level of funding has allowed OED to build a sophisticated educational capability with comprehensive and high-quality staff, equipment and supplies.

Staffing

Many types of personnel from education and related fields can assist with educational development. The following list depicts some of the educational personnel that could be hired for consulting, part-time or full-time employment. Individuals with a combination of these skills may be found.

1. Curriculum Specialist: Ph.D. or Masters level. Can help develop or refine an entire curriculum and assist in the development of new programs and courses. Can prepare grant proposals for curriculum development.
2. Educational Communications Specialist or Instructional Technologist: Ph.D. or Masters level. Can design instructional systems for courses or programs which may include printed materials, media, and computer software. Can set up audio-visual production services for producing slides, transparencies. Knows media, innovative instructional technologies, and educational applications of the computer. Can prepare grant proposals for instructional development.
3. Educational Psychologist, Specialist in Student Services or Guidance and Counseling: Ph.D. or Masters. Can improve recruitment procedures and establish student retention programs such as tutoring, remedial education, study skills, counseling, group counseling on

special issues, financial aid counseling, personal counseling, career counseling, career information services, and job placement services. Knows learning theory and testing. Can design instruction that reflects learning principles and develop tests.

4. Measurement and Testing Specialist (Psychometrician) or Research and Evaluation Specialist: Ph.D. or Masters. Can help faculty improve their examinations, design and analyze student or colleague evaluation of teaching procedures, develop criterion or norm referenced tests to assess pharmacy programs. Can evaluate programs, instructional development projects, and courses to foster improvement and provide information on quality. Can do educational research and provide information to faculty on extant educational research.
5. Science Education Specialist or Pharmacy Educator: An expert in science or pharmacy education makes a good team member when large changes in curriculum content are planned.
6. Computer Specialist from Computer Sciences or Education: An individual with programming capability, expertise in educational applications for the computer, and knowledge of data storage and retrieval systems can assist in efforts where the computer will be heavily utilized.
7. Audio-Visual Technician. Can handle A-V equipment (maintenance, storage, and repair), make slides, transparencies, slide tapes, audio tapes, photographs and other audio-visuals.
8. Writer/Editor from English, Journalism, or Education: Can develop instructional materials with supervision from instructional technologist or curriculum specialist. Assist with grant proposals. Assist with public relations.

9. Graphic Artist: Can provide lettering, technical drawings, drawings of chemical structures and free-hand drawings for visuals and printed materials.

10. Photographer: Can shoot and process pictures for slides, manuals, public relations material. Can shoot motion picture film and video tapes.

11. Instructional Aid: Can perform tasks such as data analysis, running A-V equipment or test scoring machines, helping instructors during classes, collating and stapling materials.

12. Machine Operator: Can operate equipment such as offset press, xerox, mimeo, or computer hardware.

OED's staffing pattern represents a comprehensive sampling of various educational skill areas. A curriculum specialist, instructional technologist, and evaluation and measurement specialist at the Ph.D. level direct the three OED components. Two Masters level personnel, an educational media specialist and a student services specialist manage the production of instructional materials and student recruitment and retention respectively. Two graduate students from education and psychology maintain and program the in-house computer and assist with research and evaluation activities. Two full-time secretaries assist with a variety of tasks.

Since the production work aspect of OED is extensive, the operation requires a fairly large support staff. The production staff includes five half-time student workers: photographer, graphic artist, offset operator, and two instructional aids. The production staff is drawn entirely from students who work at hourly pay rates. Production staff are hired on the basis of their skill, personality and aptitude rather than their coursework. Photographers and graphic artists are assessed on the basis of their portfolios. It is important that the graphic artist also has a background

in chemistry. The trade-off in hiring part-time students is that tasks frequently lack follow-through. Since the staff is in and out, it is sometimes difficult to keep track of the progress of tasks. The staff is recruited primarily through word-of-mouth, though positions are occasionally advertized in the campus newspaper.

The most essential production skills needed when starting an OED are: one person with skills in both photography and graphics with some background in chemistry and one person for odd-jobs.

OED has taken the position that the personality and interpersonal skills of personnel are as important as their educational background and experience.

Budget

Since 1970 the major portion of OED's budget has come from the Department of Health, Education, and Welfare under the Special Projects Grant Program of the Bureau of Health Manpower Education. Funding for the five-year project officially ended on June 30, 1975. OED will continue to operate at approximately one-half of the funding it has operated with for the past five years, through funding from the College of Pharmacy at The Ohio State University. The following charts portray a brief sketch of OED's fiscal support for the past five years.

YEAR	PERSONNEL	EQUIPMENT	CONSUMABLE SUPPLIES	TRAVEL & CONSULTANTS	OTHER EXPENSES	TOTAL REQUESTED FROM DHEW	COLLEGE OF PHARMACY'S CONTRIBUTION*	GRAND TOTAL
1970-71	$72,500	$11,125	$3,700	$6,800	$17,000	$111,125	$27,850	$138,975
1971-72	72,500	11,125	3,700	6,800	17,000	111,125	27,850	138,975
1972-73	95,228	7,565	5,300	7,800	7,249	123,142	28,352	151,494
1973-74	102,850	4,680	5,800	7,600	8,365	129,295	41,493	170,788
1974-75	107,185	8,090	6,000	7,600	8,601	137,476	41,493	178,969
Category Totals	$450,263	$42,585	$24,500	$36,600	$58,215	$612,163	$167,038	$779,201

* for personnel and major equipment purchases

Equipment

There is a tremendous variety of equipment available for educational activities, including production equipment, audio-visual equipment, computer hardware, and general office equipment. The following chart depicts OED's current equipment holdings. OED has over 150 equipment items, ranging from an in-house time-share computer to typewriter stands.

Area	Name	Price Range	Total Number of Items
Audio-visual Equipment	Slide Projectors (2 x 2)	$ 80 - 175	23
	Cassette Recorders	33 - 72	62
	TV Monitors, 22" & 9"	129 - 175	19
	Overhead Projectors	100 - 285	7
	Filmstrip Projectors	35 - 140	2
	Motion Picture Projectors Super 8 & 16mm	298 - 695	7
	Audio Tape Recorders (Reel to Reel)	145 - 460	3
	Opaque Projector	$400	1
	Headsets (Mono & Stereo)	8 - 29	9
	Microphones, including two wireless	22 - 590	5
	Lantern Slide Projector	$300	1
	Screens	49 - 160	14
	Portable Public Address Systems	65 - 250	3
	Audio Amplifiers	40 - 90	2

Area	Name	Price Range	No. of Items
Production Equipment	Photographic Equipment		
	Cameras (35mm)	$ 25 - 245	3
	Cameras (super 8)	235	1
	Copy stand	190	1
	Lenses, meters, lights	9 - 136	3
	Editor (8mm)	30	1
	Contact printer	10	1
	Slide mounter	30	2
	Strobe	40	1
	Videotape Equipment		
	T.V. camera	$625	3
	Tripods	94	3
	Equipment cart	75	1
	Lens	290	2
	Special Effects Generator	425	1
	Videotape Player	375	1
	Videotape Recorder	595	2
	Printing Equipment		
	Collator	$ 404	1
	Offset Master Maker	1468	1
	Offset Master Conversion	178	1
	Offset Press	4132	1
	Paper Drill	243	1
	Staplers (manual & electric)	11 - 78	7
	Graphic Equipment		
	Dry Mount Press	$ 168	1
	Light Box	10	1
	Paper Cutter	130	1
	Thermofax	379	1
	Other Graphics Equipment		
	Pens, templates, etc.	$ 200	-

Area		Price Range	No. of Items
Computer Hardware	Hewlett Packard 2000F Time-Share Computer	$80,000	1
	Computer Terminals		
	Hard copy	$975 - 4200	16
	Video display	$1295 - 2250	6
	Video display and/or hard copy	$1925	1
	Multiplexor	$2200	1
	Test Scoring Machine with Computer Interface	$3595	1
	Stand-alone Test Scoring Machine	695	1
Office Equipment	Typewriters	$ 150 - 440	11
	Cabinets	41 - 125	7
	Dictation Equipment	140 - 323	4
	Calculator	96	1
	Bookcases	32 - 64	19
	Tables	42 - 154	14
	File cabinets	44 - 79	19
	Desks and typing stands	132 - 210	13
	Chairs	42 - 94	32

STARTING AN EDUCATIONAL DEVELOPMENT EFFORT

There are numerous approaches to increasing the amount of emphasis on the educational process within a college of pharmacy. Deciding what type of educational development activities should and can occur in a particular college, requires consideration of many questions. Characteristics of the university or college, the pharmacy students and graduates, the pharmacy curriculum, and the faculty, should be considered. Each setting has unique needs, problems and opportunities that should be explored when selecting strategies for improving pharmacy education.

This section of the report presents a variety of ideas for enhancing involvement in educational activities. It is meant to stimulate thinking rather than provide a comprehensive or in-depth discussion of alternatives. This section includes:

A. Questions to explore

B. Educational Development Options

C. Critical Issues

Questions to Explore

The following is a list of sample questions that might be explored when attempting to organize a more systematic approach to instructional improvement. Some of the questions can be answered easily. Others are more difficult to answer, and are primarily meant to either provoke discussion, or encourage the collection of data in this area. Some of the questions could be useful at a faculty meeting or retreat to stimulate discussion on educational issues.

Assessing the University or College

1. Does the university provide instructional development, testing and measurement, computer, or other services that are available to your faculty?
2. How good are these services? How costly? How comprehensive? How accessible? Is it convenient for faculty to use these services? Is the turn-around time acceptable?
3. Is there a college or division of education? Does it contain individuals with expertise in instructional technology, educational media, tests and measurement, research and evaluation, curriculum development, educational development, and educational psychology?
4. Is it feasible to receive some type of assistance from the college of education? Can some education faculty be used as consultants? Can some education students be used as interns or graduate research associates? Can education courses, seminars, workshops, etc. be utilized by your faculty?
5. Does the campus have facilities and equipment for educational development that can be used by your faculty? Does the campus loan out audio-visual equipment? Can faculty use a campus darkroom? Can faculty use

a campus computer? How feasible is it to use campus facilities and equipment?

6. Does the university or college sponsor committees, seminars, colloquia, lectures, consultants, etc. on educational topics?
7. Is there access to information about educational innovations, research, and development through university libraries? Through other sources?
8. Are any of the allied health schools on campus or nearby involved in educational innovations? Can you collaborate in some way?

Assessing the College or Department of Pharmacy

9. Are there available funds for educational development? How much? Can further funding be requested through the university, or other means, such as grants or special project funds?
10. Is the college already involved in improving instruction? What is currently being done? How effective is it? What areas should be expanded? Should some areas be curtailed?
11. Does the college have clearly defined goals for improving instruction? Should they be clarified before preceeding further?
12. Are there one or more individuals who are currently taking responsibility for educational development activities within the college?
13. Are there institutional rewards for quality teaching?
14. Is information about improving education and developments in pharmacy education made available to faculty through faculty meetings, seminars, lectures, dissemination of educational reprints, newsletters, participation in committees, linkages to other colleges of pharmacy, and so on?

Assessing the Pharmacy Faculty

15. To what extent is the faculty aware of existing campus and in-house educational development services and facilities?

16. To what extent are available services and facilities used by faculty? If not used, why?
17. To what extent is the faculty aware of instructional options, educational research, developments in pharmacy education, educational innovations, and processes and procedures for improving education?
18. To what extent does the faculty attend lectures, seminars, or meetings on educational topics?
19. In what areas are the faculty ready to improve instruction? What is the knowledge base? What are the areas of interest? Where are the most critical problems?
20. To what extent are faculty already improving their instruction?
21. To what extent do faculty skillfully use media and other teaching techniques and strategies?
22. To what extent do faculty use well-designed, valid and reliable examinations, present course content efficiently, accurately and consistently, or use student evaluation of teaching, self evaluation or colleague evaluation information to improve their courses?

Assessing the Pharmacy Students and Graduates

23. Are high quality students being successfully recruited and retained?
24. Are students performing well on examinations?
25. Can graduates locate and retain satisfying positions in the profession?
26. What is the students' reaction to the quality of instruction?
27. What is the graduates' reaction to the quality of instruction?
28. Are the instructional formats currently used motivating students to their fullest potential?
29. Are students retaining important information?

30. Are the individual needs, interests, and aptitudes of students assessed and responded to through multiple teaching/learning strategies?

31. Are student support services, such as tutoring, remedial assistance on basic skills, diagnostic testing and feedback, counseling and job placement provided?

Assessing the Pharmacy Curriculum

32. What areas of the curriculum are the weakest? The strongest? Why?

33. Are students being over-educated or under-educated for their professional careers? For entry into graduate school?

34. Is the curriculum up to date?

35. Are the interrelationships between courses well coordinated?

36. Is the curriculum efficiently educating students in the least possible time?

37. Is the curriculum relevant to employment opportunities? To graduate school requirements?

38. Is the curriculum flexible enough to meet the needs, interests, and aptitudes of individual students?

Educational Development Options

The following is a list of options for organizing an instructional improvement effort. The list is meant to stimulate your thinking about some available options. The type of development effort that is appropriate for a college depends on its unique needs, problems and opportunities. Options are separated into activities that can be accomplished by an individual faculty member, and activities that require some institutional department or university level support. Options are also categorized by total cost in terms of dollars, time, and expertise required.

Individual Faculty Level*

Low Cost	High Cost
1. Audit or take courses for credit in education.	1. Utilize student and/or peer evaluations to improve instruction.
2. Participate in educational colloquia.	2. Utilize one of the "new teaching technologies", such as:
3. Attend "Improvement of Instruction" seminars.	a. Self paced (Keller and other)
4. Utilize audio and visual support systems.	b. Computer assisted or computer managed instruction
5. Enroll in a continuing education course in pharmacy or education.	c. Individually guided instruction
6. Participate on committees in educational areas.	d. Television
7. Obtain suggestions for readings in education from a colleague in the education department.	e. Simulation and gaming
	f. Other
	3. Institute graduate seminars on the improvement of instructions.
	4. Develop courses along the modular or multi-track curriculum patterns.

*Adapted from Brown, David G. and Hanger, William S. "130 Pieces of a Faculty Development Program". Miami University, Oxford, Ohio, April, 1975

Low Cost	High Cost
8. Organize luncheon discussion sessions on improvement of instruction. 9. Attend state and national professional conferences in education. 10. Read the "Chronicle on Higher Education", American Association for Higher Education publications, or the Jossey-Bass Series on New Directions for Higher Education. 11. Make a conscious effort to become aware of the instructional resources on your campus, such as audiovisual facilities, instrumentation laboratory, speech and hearing clinic, micro-teaching laboratory, etc. 12. Visit faculties and staff in pharmacy departments on other campuses, and invite them to your campus. 13. Seek out professional colleagues familiar with objective test strategies or evaluation strategies.	5. Contract with consultant in education to diagnose a course you are teaching, using a combination of techniques, (e.g., observation, interaction analysis, student evaluation, instruments based on the course objectives, and video or audio tapes), and provide feedback for improvement. 6. Participate in a micro- teaching laboratory. 7. Video tape your instruction, and either evaluate it yourself, or have a group of colleagues do so. 8. Participate as a subject matter specialist in the development of a standardized test. 9. Write a faculty or educational development proposal, and submit it to an outside funding agency. 10. Teach, using the case study method. 11. Participate in pharmacy consortia activities - teach via the consortium in another department, write a grant proposal for support of a consortium project, etc.

Low Cost	High Cost
14. Perform an item analysis of an objective examination, and improve the examination, using the results.	12. Write behavioral objectives for the courses you teach, and distribute them to students.
15. Talk with commercial materials salesmen and equipment manufacturers about new items available for pharmacy education.	13. Utilize "media specialists" or "instructional technologists" who audit classes and offer constructive criticism.
16. Audiotape your instruction, and either evaluate it yourself, or ask a group of peers to evaluate it.	14. Participate in a summer Teaching Skills Institute.
17. Evaluate your own teaching by completing the same evaluation instrument completed by students.	15. Buy a commercially developed pharmacy course, or instructional materials for a course, and adapt it to your needs.
18. Team teach and evaluate a course.	
19. Apply for a summer research grant for instructional improvement.	
20. Analyze how you spend your time.	
21. Improve your use of lecture support material, (audio-visual aids, student handouts, etc.)	

Institutional Level*

Low Cost	Medium Cost	High Cost
1. Establish a faculty committee on the improvement of instruction.	1. Fill a faculty vacancy with a professional educator, such as a curriculum specialist, measurement and evaluation specialist, or instructional technologist.	1. Facilitate a comprehensive and balanced approach to educational development by beginning an educational development unit which focuses on curriculum, instruction & evaluation.
2. Encourage faculty to submit evidence of instructional development activities to promotion & tenure committees.	2. Hire a consultant to suggest next steps for an educational development program.	For example:
3. Hire a postdoctoral teaching fellow in education.	3. Hire frequent consultants for small groups of faculty to discuss instructional options of interest to the faculty.	a. Hire an individual with a Ph.D. in educational psychology, or curriculum, and an M.A. in instructional technology or educational media to facilitate development in both curriculum and instructional methods.
4. Hire a postdoctoral research fellow in education.	4. Hold a faculty retreat on teaching skills.	b. Hire an individual with expertise in both measurement/evaluation and instructional development to facilitate improvement of examinations, definition of objectives, and implementation of objectives through appropriate methods.
5. Develop an "outstanding teacher" award program, or "master teacher" designation.	5. Establish a summer grant program for the improvement of instruction.	c. Hire a combination of educators that is most appropriate for your department's needs and interests.
6. Develop and distribute a monthly in-house newsletter on educational development topics.	6. Increase the colloquia and lecture budgets at the departmental and university-wide levels.	d. Follow the OED staffing pattern which utilizes three full-time Ph.D. level professionals in curriculum, instruction, and evaluation; three full-time Masters level personnel in student recruitment, support services, and production
7. Introduce a resolution to your faculty senate that recognizes faculty development and/or educational development as a faculty right and responsibility.	7. Ask a member of your staff to assume responsibility for becoming knowledgeable in new educational development opportunities and/or coordinate use of the services which already exist on campus.	
8. Urge your president to support educational development efforts of individuals.		

* ibid

Institutional Level

Low Cost	Medium Cost	High Cost
9. Give support to in-house seminars and conferences on the improvement of instruction. 10. Use graduate research associates from education to assist faculty members with instructional projects and services. 11. Use work-study students with skills in graphics, photography, and audiovisual aids to help faculty with media support. 12. Spend a few hours in conversation with your faculty to ask about their ideas for improving instruction. 13. Begin to generate interest in educational development with your faculty by making information available. 14. Provide externship experience for students in education or pharmacy by giving them course credit for working on pharmacy education projects. With this option, some supervision will be necessary.	8. Buy a percent of the time of someone from a campus teaching aids laboratory, or testing and evaluation center to work with your faculty. 9. Hire full or part-time Masters level staff in audiovisual aids, instructional technology, measurement, evaluation, curriculum, science education, or educational psychology. 10. Host a state-wide or regional conference in improving pharmacy education. 11. Purchase some new audiovisual equipment, a test scoring machine, or a computer terminal which links to the main campus computer.	management; five half-time work-study students with production skills, two half-time graduate research associates from education and psychology with computer expertise, and two full-time secretaries. e. Expand your facilities and equipment for educational development activities. f. Purchase an in-house computer system. 2. Collaborate with one or more other colleges of pharmacy to work towards improvin g instruction in tandem. Actively pursue the notion of creating a consortium of colleges to work on educational development.

Critical Issues

1. Do educational developers in pharmacy education need expertise in pharmacy?

   Pro - A pharmacy educator with top-notch content expertise in pharmacy will probably have more credibility with the faculty. He may be able to facilitate more curriculum changes than a non-pharmacist. A non-pharmacist will have to spend extra time understanding content, may be viewed as a second class citizen, and will probably receive lower priority when budget cuts are necessary.

   Con - A professional educator without a background in pharmacy will usually have comprehensive and sophisticated knowledge of educational options. An expertise in education can also be useful in writing grant proposals. None of the OED personnel have content expertise in pharmacy, which they feel has not been a barrier. Several OED staff have a background in organic chemistry and other sciences, which they feel is very helpful. A non-pharmacist tends to be less threatening, can keep the discussion centered on educational topics rather than content issues, can more fully represent the interests of education without being co-opted by a faction within the department, and can shape thinking through asking questions about content.

2. What institutional rewards can be offered to faculty who contribute their time to instructional improvement?

   A barrier to effective instructional improvement is the lack of institutional rewards for teaching excellence. Since faculty research efforts receive more weight than teaching excellence for tenure, professional recognition, promotion, and merit pay, faculty will naturally be more

drawn to spending their limited free time in research. OED has attempted to help reward faculty members for improving their instruction by: writing letters of support for faculty promotion and tenure files which document their teaching improvement activities; providing visibility to faculty efforts within the College, and through a dissemination brochure sent to other colleges, helping faculty to give papers on their instructional improvement activities at the American Association of Colleges of Pharmacy meetings, helping faculty to write proposals for funding instructional improvement projects, testing faculty manuscripts that are eventually published as textbooks, providing a means for faculty to assess their students' response to teaching improvement efforts, and providing quiet personal support which acknowledges that "teaching is important". Other faculty reward options include: merit pay or promotion and tenure for teaching excellence, outstanding or master teacher awards, and psychological support from the Dean or Division Chairman.

3. Is the organizational placement of an educational development unit important?

It is important that an educational unit is seen neither as a surrogate dean, nor as a group of technical assistants. The unit should not have any direct line authority over faculty, since their role is to help faculty. Similarly, the unit should probably have a dotted, rather than solid, line relationship with the dean, so that the unit has optimal responsibility and authority in educational matters. On the other hand, the unit should not have a lower status than faculty. Key educational personnel should have faculty status to enhance their credibility and legitimize their role with faculty. It may be difficult for the unit to serve the entire college if it is budgeted out of one division or area

of the college.

4. How important is a basis of support from the administration and faculty for facilitating educational improvement?

The active support of the college administration is critical for facilitating faculty involvement and meaningful accomplishments. Sufficient time must be scheduled with administrative personnel to build a foundation for their support. It is recommended that future efforts have at least two hours per month with administrative staff to report on activities, and discuss up-coming plans. These sessions should also be used to discuss with the staff the more subtle aspects of educational development. The administration should be aware of the succeeding levels of accomplishment for improving instruction, and the pay-offs at each level. It is easy for instructional development to stop at a low level, such as improving the use of printed and mediated materials in classes, because the administration is not sufficiently aware of the options and pay-off for higher levels of development.

Next in priority to sharing accomplishments and ideas with the administration is sharing information with faculty members about the procedures and pay-off of educational development, so that they can appreciate and use it to its fullest potential. The faculty must also be educated to expect the next level of accomplishment for improving instruction. Faculty should be frequently provided information on the importance of results that can be expected from various types of educational development activities. If sufficient faculty education does not occur, long-term interest in educational improvement will be difficult to maintain.

5. How can the amount of faculty time required for development activities be kept at a minimum?

   An important and ever-present constraint to educational improvement is lack of time. The development of high quality instruction requires time, usually a lot of time. Faculty time can be saved by hiring professional educators to work with the faculty, but faculty involvement is crucial to developing methods and products that will be consistently used by them. OED has responded to time limitations by helping faculty devise mechanisms for saving time, and making their instruction more efficient. Scoring tests automatically, managing grades with the computer, making slide/tapes of sections of courses which are frequently repeated, developing slides, transparencies and student handouts to replace chalkboard illustrations, using the computer to develop and analyze tests, and other time-saving devices, encourage faculty participation.

6. How much change in current educational practices should be aimed for?

   The trauma associated with changing habits often limits the amount of change that can occur. Faculty that are accustomed to the intrinsic support gained from giving lectures may not accept the drastic role change required for using self-instructional materials. The amount of change an individual can accept varies significantly. It is usually easier to help several change-oriented faculty members make drastic changes in their courses than to help the entire faculty make a simple change. In other words, it is easier to help a good professor go from very good to excellent than to help a poor or fair professor become good. The change orientation of faculty can be enhanced through providing information and experience, but personality factors are the chief determinant of how

much an individual is willing to change.

7. How can the credibility of an educational development unit be enhanced? Lack of credibility of an educational development unit may severely effect faculty use. An educator in a hard sciences faculty can be viewed as a second-class citizen. If the educator does not have a background in pharmacy, or at least the sciences, or is not highly skilled in his profession, credibility may be further reduced. Without credibility, it is difficult to generate change. Credibility can be enhanced by organizational placement of the unit, support by the administration, high visibility of activities, rigorous hiring procedures for educational personnel, highly qualified personnel, and personnel with outstanding inter-personal skills.

Office of Educational Development
Faculty

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